U.S. DEPARTMENT OF COMMERCE
National Technical Information Service

PB-259 502

Guidelines for Areawide Waste Treatment Management Planning. (Section 208 FWPCA, Amendments of 1972)

Environmental Protection Agency, Washington, D C

Aug 75

BIBLIOGRAPHIC DATA SHEET

1. Report No.

2.

3. Recipient's Accession No.
PB-259 502

4. Title and Subtitle
Guidelines for Areawide Waste Treatment Management Planning. (Section 208 Federal Water Pollution Control Act, Amendments of 1972)

5. Report Date
Aug 75

6.

7. Author(s)

8. Performing Organization Rept. No.

9. Performing Organization Name and Address
Environmental Protection Agency
Washington, D.C.

10. Project/Task/Work Unit No.

11. Contract/Grant No.

12. Sponsoring Organization Name and Address

13. Type of Report & Period Covered

14.

15. Supplementary Notes
(PC A08/MF A01)

16. Abstracts

The Section 208 areawide planning and management program for solving water pollution problems is perhaps the most comprehensive program that the Congress has established to bring about environmental quality. This program ties together the various federal water pollution abatement requirements (including municipal, industrial, residual waste, runoff, and ground water pollution abatement) and places the responsibility for planning and implementing these provisions with regional and local agencies. While it is not possible for EPA to provide answers to all the water quality problems that 208 programs should resolve, these guidelines describe the overall factors which should be taken into account and provide a framework for designated 208 planning agencies to use in developing their plans and implementation programs.

17. Key Words and Document Analysis. 17a. Descriptors

*Water pollution abatement,
*Sewage treatment,
*Management methods,

Management planning,
Project planning,
Methodology,
Land use,
Sources,
Regional planning,
Financing,
Cost analysis,
Public relations,
Citizen participation,
Environmental surveys,
Environmental impacts,
Social effect,
Economic impact,
Selection,
Reporting.

17b. Identifiers/Open-Ended Terms

Alternatives,
Federal Water Pollution Control Act Amendments of 1972.

17c. COSATI Field/Group 13 B 5 A

18. Availability Statement
National Technical Information Service
Springfield, Virginia 22161

19. Security Class (This Report)
UNCLASSIFIED

20. Security Class (This Page)
UNCLASSIFIED

21. No. of Pages
161p

22. Price
6.75/3.00

FORM NTIS-35 (REV. 10-73) ENDORSED BY ANSI AND UNESCO. THIS FORM MAY BE REPRODUCED USCOMM-DC 8265-P74

308014

PB 259 502

GUIDELINES FOR AREAWIDE WASTE TREATMENT MANAGEMENT PLANNING

U.S. ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460
AUGUST 1975

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U. S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

161

GUIDELINES

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AREAWIDE WASTE TREATMENT MANAGEMENT PLANNING

SECTION 208
FEDERAL WATER POLLUTION CONTROL ACT
AMENDMENTS OF 1972

Environmental Protection Agency
Washington, D.C. 20460

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FOREWORD

The Section 208 areawide planning and management program for solving water pollution problems is perhaps the most comprehensive program that the Congress has established to bring about environmental quality. This program ties together the various federal water pollution abatement requirements (including municipal, industrial, residual waste, runoff, and ground water pollution abatement) and places the responsibility for planning and implementing these provisions with regional and local agencies.

The Congress had in mind a number of guiding principles in creating the Section 208 Program. First, the complex technical and institutional problems of water quality protection vary so widely across the Nation that long-term solutions to these problems will necessarily depend on decentralized management. Secondly, a close relationship exists between misuse of resources and generation of pollutants; therefore, developing efficient abatement strategies requires a total resources perspective. Third, much of the authority and financial commitment needed to resolve water quality problems rests with local government. This means that implementation of 208 programs will require new legislation for water quality control at the local level, which makes involvement of the public and local elected officials a prerequisite in creating a successful 208 program. The fiscal responsibility of local government is especially important, since providing services such as sewage treatment and protection of water supply and water uses and coordinating these services with other community services are intimately related to the fiscal viability of the community.

While it is not possible for EPA to provide answers to all the water quality problems that 208 programs should resolve, these guidelines describe the overall factors which should be taken into account and provide a framework for designated 208 planning agencies to use in developing their 208 plans and implementation programs.

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CHAPTER 1

INTRODUCTION

1.1 Purpose

The Federal Water Pollution Control Act Amendments of 1972 (hereinafter referred to as the Act) sets forth requirements for controlling all types of water pollution. EPA's overall approach for dealing with these problems and for implementing those requirements of the Act is set forth in the Water Quality Strategy Paper. These guidelines represent an approach for carrying out Section 208 of the Act, which provides for areawide management planning in areas with substantial water quality control problems due to urban-industrial concentrations or other factors. Regulations on 208 area and agency designations have been published (40 CFR, Part 126) as well as interim regulations on 208 planning grant applications (40 CFR, Part 35, Subpart F).

1.2 Applicability

This guideline is intended to assist 208 planning agencies in carrying out their areawide waste management planning responsibilities within designated areas. It applies also to other agencies--local, state, and federal--that may be involved in the planning process for those areas or in plan review procedures.

1.3 Objectives of the 208 Program

The overall objective of the Act is to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters" (Section 101(a)). To achieve this objective,"it is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water be achieved by July 1, 1983" (Section 101(a)(2)). To enable meeting the Act's objectives, "it is the national policy that areawide waste treatment management planning processes be developed and implemented to assure adequate control of sources of pollutants in each State" (Section 101(a)(5)).

Thus, the objective of 208 planning is to meet the 1983 water quality goal by developing a plan as described in Section 208(b)(2), selecting a management agency(s) to implement the plan as specified in Section 208(c)(2), and demonstrating that the initial plan will enable meeting the 1983 goal of the Act. This demonstration is needed in order for the state to certify, pursuant to Section 208(b)(3), that the 208 plan is consistent with applicable basin plans.

1.4 Overview of the 208 Program

Through Section 208 designation, local areas are provided a unique opportunity to meet the 1983 water quality goals by planning and managing a comprehensive pollution control program for municipal and industrial wastewater, residual waste, storm and combined sewer runoff, nonpoint source pollutants, and land use as it relates to water quality. Through a locally controlled planning agency, an area can select a cost-effective and institutionally feasible plan directed to meet the 1983 goals of the Act. It should focus on an integrated approach for identifying and controlling the most serious water pollution problems initially and, over time, resolving the remaining problems, where feasible. Particular emphasis should be placed upon nonstructural approaches to pollution control (fiscal policy, land management, nonpoint source preventative measures) rather than traditional structural measures normally requiring large investments. The management agency and institutional arrangements most able to ensure implementation of the plan should also be selected by the area. Periodic review and updating of the plan and management arrangements would allow for response to new information and changing conditions.

Table 1.1 on page 1-3 illustrates how the 208 program can develop the measures needed to resolve specific technical and institutional problems of pollution abatement, and how these measures may be implemented by a 208 management agency.

1.5 Program Output Requirements

To summarize the measures needed to solve both the technical and institutional problems of water pollution abatement and to implement these measures, a 208 program should have the following program elements:

- Municipal and Industrial Treatment Works Program
- Residual Waste Management Program
- Urban Stormwater Management Program
- Nonpoint Source Management Program
- Regulatory Programs (Including Discharge Permits) to Implement Abatement Measures
- Management Program -- Management Agency(s) and Institutional Arrangements to Supervise and Finance Plan Implementation

In addition to these major elements, the interim regulations on 208 plan contents (40 CFR, Part 35, Subpart F) require an environmental assessment and certain plan recommendations and certifications.

Table 3.1 found on page 3-24 of this guideline delineates specific elements or outputs which may be included in a 208 plan to satisfy each requirement of the regulation (40 CFR, Part 35, Subpart F). The table also relates each element to parts of this guideline which contain an explanation of the type of analysis and planning considerations that could be followed to produce the specific elements.

Table 1.1

208 WASTE TREATMENT MANAGEMENT PROGRAM

PROBLEM OR NEED	MEASURES TO RESOLVE PROBLEM	IMPLEMENTATION MECHANISM
. **Municipal and Industrial Treatment Works** . **Municipal**	- definition of service areas - capacities and collection systems - levels, locations, types of treatment - preliminary cost estimates - preliminary schedules of construction	. Municipal and Industrial Treatment Works Program - Step I Facilities Planning Grant (to complete planning requirements) - Step II Plans and Specs Grant - Step III Construction Grant - State Program (Sec. 106) Priorities for Municipal Treatment Works Construction - Sec. 402 Discharge Permits - Regulatory program--local ordinance--on sewer use, industrial location, and industrial tie-ins to municipal treatment plants
. **Industrial**	- definition of treatment levels (in coordination with State Water Quality Management Plans) - tie-ins to municipal works	
. **Industrial pre-treatment**	- analysis of pre-treatment needs and requirements of Sec. 307	
. **Residual Waste Management** . **Municipal Sludge**	- preliminary identification of disposal systems including disposal areas	. Residual Waste Management Program - Step I-III Grants for Municipal facilities sludge disposal or utilization systems - Remedial management of existing disposal systems - Regulatory programs--local ordinances--designating disposal or utilization areas and performance criteria for the use
. **Industrial and Solid Waste Disposal**	- identification of disposal sites - remedial measures for existing problems - design or performance criteria for operating new disposal areas	
. **Urban Stormwater Management**	- analysis of magnitude and possible measures for correcting existing problems - performance criteria for construction of new systems	. Urban Stormwater Management Program - Corrective actions and better management of existing systems - Regulatory program--local ordinance--on performance criteria for construction of new stormwater systems
. **Nonpoint Source Management (Agriculture, Silviculture, Mining, Construction, Salt Water Intrusion, Groundwater Problems)**	- identification of "Best Management Practices" for existing and new nonpoint source problems	. Nonpoint Source Management Program - Preventative measures in managing public lands and resources - Regulatory program--permits, licenses, land use management, conservation plans, etc. to implement Best Management Practices on private lands
. **Institutional Capability to Resolve Pollution Problems (Legal, Financial, Managerial Capability)**	- analysis and selection of management agency(s) and institutional arrangements to implement abatement and regulatory measures on an areawide basis - analysis of legal, financial, and managerial capabilities needed to adequately implement plan	. **Management Program** - **Establishment of management agency(s) and institutional arrangements to supervise and finance implementation of above programs**

The review and approval of 208 plans by the states and EPA will be based on the finding that the requirements of the 208 regulations (40 CFR, Part 35, Subpart F) have been met. In making their determination that these requirements of the regulation have been met, the states and EPA will compare outputs with those required by checking the list of specific elements. Further detail on plan review and approval procedures is provided in Chapter 14.

1.6 Planning Process Overview

This guideline incorporates a series of planning steps which should enable evaluation and selection of alternative abatement measures and means to implement these measures. The following is a simplified summary of these planning steps, accompanied by some examples of how the steps might apply to typical pollution problems likely to be encountered in 208 planning areas:

A. Identify problems in meeting 1983 goals of the Act. The pollution problems should be identified in terms of their relative impact on water quality. Similarly, existing institutional problems impeding solution of water quality problems should be identified.

Example: To meet the 1983 goals of water suitable for fishing and swimming may require high levels of abatement for municipal and industrial point sources as well as nonpoint sources. Municipal and industrial point sources may present the worst problem under low flow stream conditions. It may be necessary to provide higher than national base level treatment for these sources in order to meet water quality standards. In the process of upgrading treatment for existing municipal sewage treatment plants and constructing new plants, the location of discharge points is an important variable affecting water quality. Treatment plant collection systems also influence where development will occur, which affects nonpoint source runoff. Finally, the design of treatment systems will need to include options for utilizing or disposing of the residual by-product of the treatment process.

Even after the point source problem has been solved, it is likely that rainfall-related sources of pollution such as urban runoff may cause severe stress on aquatic life due to the heavy metals and toxic substances washed into the stream.

In terms of institutional problems, the fragmented and small treatment works authorities in the area would have to join together to upgrade treatment levels to meet the 1983 goals. In addition, a management agency or agencies may need to be designated to establish a nonpoint source and residual waste management program, including local adoption of ordinances to require "best management practices" for various nonpoint source generating activities.

B. Identify constraints and priorities. Both technical and management constraints on meeting 1983 water quality goals should be identified. Priorities for solving water quality problems should be established.

Example. From a technical standpoint, there may be reaches of streams in the area that cannot meet the 1983 goal. The goal may not be attainable, if a technological solution, for example, dredging sludge deposits from a river, would cause as many long term water quality problems as allowing the deposits to be naturally flushed out of the river over time. A management constraint may be a lack of financial capacity to deal with a long standing problem such as drainage from abandoned mines. Priorities should focus on problems that can be most effectively solved within existing technological and economic capabilities. For example, renovating urban stormwater systems may be a low priority due to the high capital costs. On the other hand, establishing a treatment works program may be a very high priority. The 208 plan should specify a number of interim outputs such as service areas and treatment levels to provide an areawide perspective in further facilities planning.

C. Identify possible solutions to problems. All reasonable regulatory and management control methods should be identified.

Example. To meet the high degrees of abatement of industrial and municipal sources, it may be necessary to consider larger regional treatment plants or pretreatment of industrial wastes prior to discharge to a municipal facility. However, the technical solution of a large regional treatment plant must also be feasible from an institutional standpoint. This would require preliminary analysis of management agency(s) and institutional arrangements for implementing a particular technical solution. Similarly, in the case of nonpoint sources, the overall feasibility of managing a particular problem should be investigated before the details of possible management practices are developed. For example, if improved street sweeping is thought to be an option for mitigating impact of urban stormwater, the practicality of changing parking schedules should be assessed from the outset. The regulatory measures for establishing "best management practices" for other nonpoint sources should also be identified. The authority for regulating certain activities (agricultural practices or mining) may not exist at the local level, and would therefore not be feasible unless enabling legislation were passed.

D. Develop alternative plans to meet statutory requirements. Alternative technical abatement methods for municipal and industrial wastes, stormwater, nonpoint sources and residual waste, for both new and existing sources should be combined into areawide plans. Comparable alternatives for the implementation of the technical options through establishing waste management programs and regulatory programs should be identified.

> Example. The technical alternatives for municipal and industrial wastes might include options for regionalization of treatment for municipal and industrial wastes, separate systems, or upgrading existing municipal systems. Waste treatment capacities of these alternatives should correspond to the projected land development pattern in the area. The residual waste disposal options would vary depending on the choice of treatment systems. Alternative management programs for construction, operation, and maintenance of the treatment works would have to be developed and include consideration of the financial arrangements for the local share of construction, the financing of operations and maintenance, and cost recovery and user charges. These assessments need only be as specific as the degree of detail undertaken in the 208 plan, as opposed to further facilities planning.
>
> Technical alternatives for managing nonpoint sources might include a series of alternative designs for attenuating the runoff from new urbanized areas, as well as alternative management practices for existing nonpoint sources in categories such as agriculture or mining. The management programs for implementing the design criteria for new stormwater and drainage systems would require proper enabling legislation, an agency capable of supervising the construction of new drainage systems, and adequate incentives such as tax advantages for adopting the management practices.

E. Analyze alternative plans. The alternatives should be evaluated according to the criteria of minimizing overall costs, maintaining environmental, social, and economic values, and assuring adequate management authority, financial capacity, and implementation feasibility in meeting water quality and carrying out the requirements of Sections 208(b)(2) and (c)(2) of the Act.

> Example. To meet water quality goals, the least cost strategy for abating municipal sources may involve a large regional treatment plant. This option would allow establishing a regional approach to sludge utilization through land application. Thus, this option would be environmentally and economically desirable. However, the option would involve constructing sewer interceptors through undeveloped land, which, unless land use controls were strictly applied, could induce further development. This option would involve the greatest institutional change, since it would require creating authority for regional financing of treatment.

For existing nonpoint sources such as urban stormwater, street sweeping might be less costly than attempting to treat stormwater. However, altering parking regulations to allow better sanitation would be disruptive to transportation. The alternative of separating some existing combined storm and sanitary sewers could be accomplished in the course of upgrading treatment plants, and might be the least cost solution for combined sewer overflow.

Adopting design standards for new drainage systems would help protect future water quality. The costs of these measures could be offset through tax breaks. The feasibility of implementing these design standards would depend on adequate staffing of the agencies responsible for supervising their enforcement.

F. Selection of an areawide plan. The selection should be based upon systematic comparison of the alternatives.

Example. Through a process of public involvement in the planning process, there should be general familiarity with options for meeting water quality goals. Having identified the least cost plan (where cost includes economic, social and environmental considerations), the units of government involved in recommending plan approval might also consider compatibility of the various alternative plans with other community goals.

G. Plan approval. Plan review and approval will be based on whether the plan demonstrates that 1983 water quality goals will be met and that the plan meets the requirement of Sections 208(b)(2) of the Act.

Example. The plan demonstrates that the combined measures for abating point and nonpoint sources will be adequate for meeting standards. However, to the extent that some of the cause and effect relationships between nonpoint source problems and water quality cannot be documented, the approval of the plan should be contingent on development of plan performance assessment including an ongoing monitoring program. The management program meets the requirements of the Act for waste treatment and regulatory programs. However, some of the regulatory measures needed to implement the plan are in the form of legislative proposals before local governments in the area. The plan approval should be based on the assumption that the regulatory measures will become law within a given time period. The state should monitor the progress of implementation and recommend or enact alternative measures if the original regulatory proposals are not adopted locally.

H. Periodic updating of the plan. A specific procedure should be defined for monitoring plan effects and developing annual revisions to the plan.

> Example. The procedure for plan updating is that instream monitoring will be carried out by the management agency(s) to determine needed plan revision. The state will monitor progress of the management program and recommend specific actions needed to assure meeting water quality standards.

I. Flexibility and Local Initiative in Planning and Implementation. A planning process based on the approach outlined above and further elaborated in these guidelines should achieve the planning objectives of Section 208. To meet these objectives, planning agencies may use discretion in employing any other logical planning process that achieves the 1983 water quality goals of areawide waste management and produces a plan consistent with the output requirements of the program.

1.7 Planning Criteria

As previously stated, the objective of 208 planning is to meet the 1983 water quality goals by developing a plan pursuant to Sections 208(b)(2) and (c)(2) of the Act. The plans will, therefore, be evaluated by States and EPA in terms of their ability to achieve these objectives in a given area. The Act also provides certain criteria for choosing among the means for achieving the 208 objectives.

The following criteria should be used in the planning process (see Chapter 3) and in plan selection (see Chapter 12) and will be applied by the states and EPA in plan review and approval (see Chapter 14):

A. Cost Effectiveness

The Federal Water Pollution Control Act specifies cost-effectiveness as the criteria for the planning and development of wastewater management programs, in particular as those programs relate to municipal treatment works and controls of combined sewer overflows and storm sewer discharges.

EPA has defined cost-effectiveness analysis as a systematic comparison of alternatives to identify the solution which minimizes total costs to society over time to reliably meet given goals and objectives. Since Section 208(b)(2)(E) specifies that the plan should document the economic, social, and environmental impact of plan implementation, the local economic impact (in addition to resource costs) must be included in the total costs to society. Thus the total costs to society to be minimized should include:

- resource costs
- economic costs
- social costs
- environmental costs

In the case of 208 planning, effectiveness refers to meeting the 1983 goals of the Act while providing for the highest practical degree of technical reliability in the pollution control alternative that is chosen.

B. Implementation Feasibility

Explicit criteria for determining adequacy of the management provisions for carrying out areawide waste treatment management are not provided in the Act. This guideline sets forth the following criteria further elaborated in Chapter 3, for evaluating implementation feasibility of the management provisions of a 208 plan:

- adequate legal authority
- adequate financial capacity
- practicability
- managerial capacity
- public accountability

C. Public Acceptance

Since the success of a 208 plan depends on its acceptance by affected units of government, the acceptability of the plan to the general public and elected officials in a 208 area should also be regarded as a basic planning criterion. The application of this criterion in the planning process is further discussed in Chapter 3.

CHAPTER 2

RELATIONSHIP WITH OTHER PROGRAMS

2.1 Introduction

This chapter summarizes the relationships between planning activities pursued under Section 208 of the FWPCAA and (a) water pollution control measures authorized by other sections of the Act; (b) EPA programs designed to protect other environmental media (e.g., air) and to promote environmentally sound practices (e.g., solid waste disposal); and (c) other areawide management programs.

2.2 Relationships Between Section 208 Planning and Other FWPCA Provisions

A. Relationship Between 208 and 303(e) Basin Plans

303(e) basin plans constitute the overall framework within which 208 plans are developed for specific portions of a basin with complex pollution control problems. Basin plans: 1) provide water quality standards and goals; 2) define critical water quality conditions; 3) provide waste load constraints; and 4) may help delineate 208 area boundaries. The results of 208 planning will constitute an integral part of these basin plans. 208 plans must be consistent with basin plans, and should be annually certified as so by the governor.

B. Relationship Between 208 and 201 Facilities Plans

- 201 Facilities Planning

Facilities planning consists of the plans and studies prerequisite to the award of grant assistance for detailed design and construction of publicly-owned treatment works. In the absence of a completed and approved 208 plan, the facilities plan must encompass the following features:

1. Description of the planning area.

2. Selection of service areas.

3. Selection of overall treatment systems, including location, capacity and configuration of all facilities, treatment levels, and preliminary identification of type of treatment and method of disposal of residual wastes.

4. Analysis supporting the selection in 2 and 3 based on identification, evaluation and cost-effectiveness comparison of alternatives.

5. Preliminary designs and studies related to the selected wastewater treatment systems, including sewer evaluation surveys, detailed surface and subsurface investigations of sites for proposed facilities preliminary designs and detailed cost-effectiveness studies of individual proposed facilities, an environmental assessment, and other requirements set forth in Section 35.917-1 of the Title II regulations.

○ 208 Areawide Planning

Areawide planning sets forth a comprehensive management program for collection and treatment of wastes and control of pollution from all point and nonpoint sources. Control measures for abating these sources utilize a combination of traditional structural measures together with land use or land management practices and regulatory programs. These measures are implemented by the areawide management agency or agencies. An initial areawide plan is developed over a prescribed planning period and, thereafter, updated and approved annually.

The portion of the 208 plan devoted to future construction of publicly-owned treatment works should select and describe planning and service areas and treatment systems, and provide supporting analysis for the selection. The 208 planning requirements, therefore, overlap with the 201 planning requirements described in points 1-4 in the previous section.

○ Area Coverage

An areawide plan covers a large area with complex water quality problems, generally an entire metropolitan area. A facilities plan focuses on a complete system or systems of municipal treatment works extending over a geographic area large enough to consider adequately the cost-effectiveness of alternatives. An areawide planning area generally includes more than one facilities planning area, depending on hydrologic and geographic conditions.

○ Coordination and Funding

The agency's policy on relationships between 201 and 208 planning in the same area during the period before final approval of a 208 plan is as follows:

1. New 201 facilities plans will be started and carried out as provided in the state priority list.

2. The scope and funding of 201 facilities planning will be sufficient to collect data and conduct all analyses necessary for expeditious completion of the 201 plan.

3. Facilities and areawide planning will be coordinated closely to avoid unnecessary fragmentation and duplication, potential conflicts and excessive planning costs. Data

and analytical work will be shared, but completion of 201 plans should not be dependent on the 208 planning process.

4. Facilities plans that are completed and approved will continue through the Step 2 and 3 stages after timely review and comment by the 208 planning agency.

- Interim 208 Outputs

Interim outputs are necessary to promote the desired areawide consistency and compatibility in subsequent facilities planning. The following interim outputs must be completed within nine (9) months unless the EPA Regional Administrator grants time extensions upon the recommendation of the 208 planning agency and the state.

- Service area delineation for municipal wastewater treatment systems throughout the designated area
- Existing population and land use and projected population and land use for the twenty (20) year planning period
- Projected waste loads and flows generated for each service area corresponding to the existing and projected population and land use
- Revision (if any) of the waste load allocations

Interim outputs need to be emphasized in the planning process to ensure that activities and decisions on the part of an areawide agency are directed at timely inputs to other planning and construction programs. The areawide planning agency will need to place high priority and sufficient effort on providing these and other needed interim outputs according to the schedule included in the approved work plan. Guidance on developing these outputs is contained in Chapters 3 and 5 of this guideline.

Upon completion of the interim outputs, the 208 planning agency shall submit them to the state for review and approval and transmittal to the EPA Regional Administrator for concurrence as fulfilling partial requirements of 208 planning. In some instances, further areawide planning may reveal that the interim outputs should be modified. Such modifications and associated justifications should be promptly brought to the attention of the state and affected facilities planning agencies. (This should occur in the normal process of having close and continuing coordination between states, areawide and facilities planning agencies). The state shall determine the feasibility and practicality of incorporating these modifications in the facilities planning and obtaining concurrence of the Regional Administrator.

After interim outputs are developed and approved by the state and EPA for a 208 planning area, the relationship between 201 and 208 planning in that area will be the same as that described under the section on "coordination and funding" above except that:

1. New facilities planning will be consistent with the approved interim outputs of the 208 plan.

2. The scope and funding of new 201 planning should not extend to developing a justification for the interim outputs. This justification already will be available from the 208 planning process.

- Approved 208 Plan

The following policy on program relationships should be carried out after the areawide plan has been completed and approved and the agency or agencies identified to construct, operate and maintain the municipal wastewater treatment facilties required by the plan:

1. All facilities plans underway at the time of approval will be completed by the agency which received the Step 1 grant. The planning effort will continue as before approval unless the analysis in the approved 208 plan clearly justifies a change in required treatment levels or alternative approach on the basis of lower costs or major changes in environmental impact.

2. The scope and funding of new facilities planning will be sufficient to supplement the data and analysis in the 208 plan to the extent necessary to provide a complete facilities plan as required by Section 35.917 of the Title II regulations.

3. New grants for 201 plans will be made only to the management agencies designated in the approved 208 plan. New facilities planning will be consistent with the approved 208 plan.

C. Relationship Between 208 Plans and 402 Permit Program

The 402 National Pollutant Discharge Elimination System Permit Program is designed to ensure that pollutant dischargers will not exceed prescribed levels. The permit system provides an essential tool for implementation of the 208 plans within the framework of the 303(e) basin plans. No permits may be issued for point sources which are in conflict with approved 208 plans since they automatically become part of the overall 303(e) basin plans. The 208 planning agency should assess current permit requirements and, when needed to achieve the 1983 goals, recommend appropriate conditions for future permit issuance.

2.3 Relationships Between 208 Planning and Other EPA Programs

A. Relationship Between 208 Planning and Air Quality Programs

Sections 107, 108, 109 and 110 of the Clean Air Act provide for the establishment of ambient air quality standards, the partitioning of the Nation into Air Quality Control Regions, and the preparation of implementation plans to show how the attainment and maintenance of the standards in each region will be accomplished. To simplify planning for the maintenance of standards, many air quality control regions are also partitioned into Air Quality Maintenance Areas pursuant to 40 CFR 51.12(f). States are responsible through State Implementation Plans (SIPs) for the attainment and maintenance of the air quality standards.

During the 208 planning process, planners should acquire a general familiarity with the requirements of the applicable SIP in the Air Quality Control Region(s) in which the 208 area is located. If any portion of a 208 area is located within an Air Quality Maintenance Area, planners should coordinate their activities with the Air Quality Maintenance Area Plan development and implementation process. This coordination should include:

1. Use of a consistent data base, especially growth projections;

2. Promotion of complementary air and water quality management strategies;

3. Assessment of 208 plan implementation on air quality, especially the primary and secondary effects of treatment facilities;

4. Review by the appropriate agency(s) to ensure that 208 plans are consistent with applicable portions of the State Implementation Plans. It would be advisable to arrange periodic reviews rather than relying on a single review at the end of the planning process.

Planners should also review the applicable state procedures for implementing and enforcing Section 111 (Standards of Performance or New Stationary Sources) and Section 112 (National Emission Standards for Hazardous Air Pollutants) of the Clean Air Act to ensure compatibility with 208 planning. These standards may be important because of their impact on decisions, for example, concerning sludge incineration and the location of facilities generating air pollutants.

B. Relationship Between 208 and Solid Waste Programs

Section 208(b) calls for regulatory programs over all dischargers as well as processes to control disposition of residual waste and disposal of pollutants on land or in subsurface excavations. Thus solid waste and sludge disposal regulation is needed in a 208 program. Further information on regulatory programs is contained in Chapter 7. Information on sludge utilization or disposal is contained in Chapter 5.

In developing programs for dealing with water pollution from solid waste and residual disposal, state plans for solid waste management should be examined for recommended organizational and technological solutions pertaining to the 208 area. Local agencies having primary responsibility for regulating and implementing solid waste management controls should be identified. The effects of the control program should be considered and appropriate measures taken in cooperation with local agencies to ensure compatibility between the water quality management provisions of 208 planning and solid waste management within the area.

2.4 Relationship Between 208 Planning and Other Areawide Management Programs

The land use aspects of 208 planning provide a direct linkage with other areawide planning efforts within the area including those supported under the HUD 701, water and sewer, and flood insurance and disaster programs, DOT transportation plans and NOAA coastal zone management plans. 208 planning should be viewed as providing the water quality component of the comprehensive plan for the area. Other area planning activities should be considered to ensure that their impact on water quality is incorporated into the 208 planning process and that 208 plans are consistent with these activities. This will facilitate the development of a coordinative relationship between 208 agencies and related agencies which should be carried over into the 208 implementation phase.

Special attention should be given to related plans which are being developed concurrently with the 208 plan. It is likely, for example, that many areas will be preparing land use elements under the HUD 701 program and/or coastal zone management plans. These types of plans will be of particular importance since they will be examining issues related to development, land use, and water quality. The 208 planning agency should establish procedures to ensure that such plans are consistent with the 208 plan.

CHAPTER 3

PLANNING PROCESS

3.1 Purpose

The purpose of the planning process is to systematically evaluate alternative means of achieving water quality goals and to formulate a plan that can be implemented by a 208 management agency. The planning process must integrate technical needs for pollution abatement and management arrangements capable of implementing the abatement measures, and provide for public participation in plan development.

The technical planning portion of the planning process involves identifying the priority water quality problems of the area, recognizing any constraints in dealing with the problems, and developing alternatives to achieve water quality goals. The alternative plans may then be evaluated according to the planning criteria discussed in Chapter 1.

Management planning, which concerns selection of a management agency or agencies and development of appropriate institutional arrangements for plan implementation, should be conducted concurrently and in coordination with technical planning. Management planning should identify water quality management problems, and analyze the capability of existing agencies and arrangements to carry out the regulatory and management requirements of Section 208. Institutional problems, lack of authority, or lack of financial capacity for meeting Section 208 requirements should be identified. Alternative means to acquire proper authority, financial capacity and effective institutional arrangements for plan implementation should be developed. Finally, alternative management agency(s) and institutional arrangements should be evaluated and a single alternative selected according to criteria discussed in this chapter.

Developing alternative technical and management plans and selection of an areawide waste treatment management plan require public participation throughout the planning process. Public participation requirements and means for ensuring adequate participation at each stage in the planning process are discussed in Chapter 10.

3.2 Goals and Policies of the Act and Other Water-Related Goals of the Planning Area

To complement the 1983 water quality goals of the Act, provisions of Title II of the Act provide for additional aspects of water quality protection such as:

- Water conservation and resource utilization through wastewater reuse or recycling;

- Management of residual waste;

- Multiple use of wastewater treatment systems and associated lands for such purposes as water supply, recreation, aesthetics, and fish and wildlife habitat;

- Protection of ground water quality

Any other water-related goals of the 208 planning area, such as provision of adequate water supply and programs for land or water resource management should be identified for consideration in development of the plans. These related goals should be recognized in the planning process and should be incorporated into the plan to the extent that their achievement would not reduce the cost-effectiveness of the water quality management measures.

Finally, the results of the planning process should be compatible with other plans for the 208 area, such as those discussed in Chapter 2.

3.3 Technical Planning

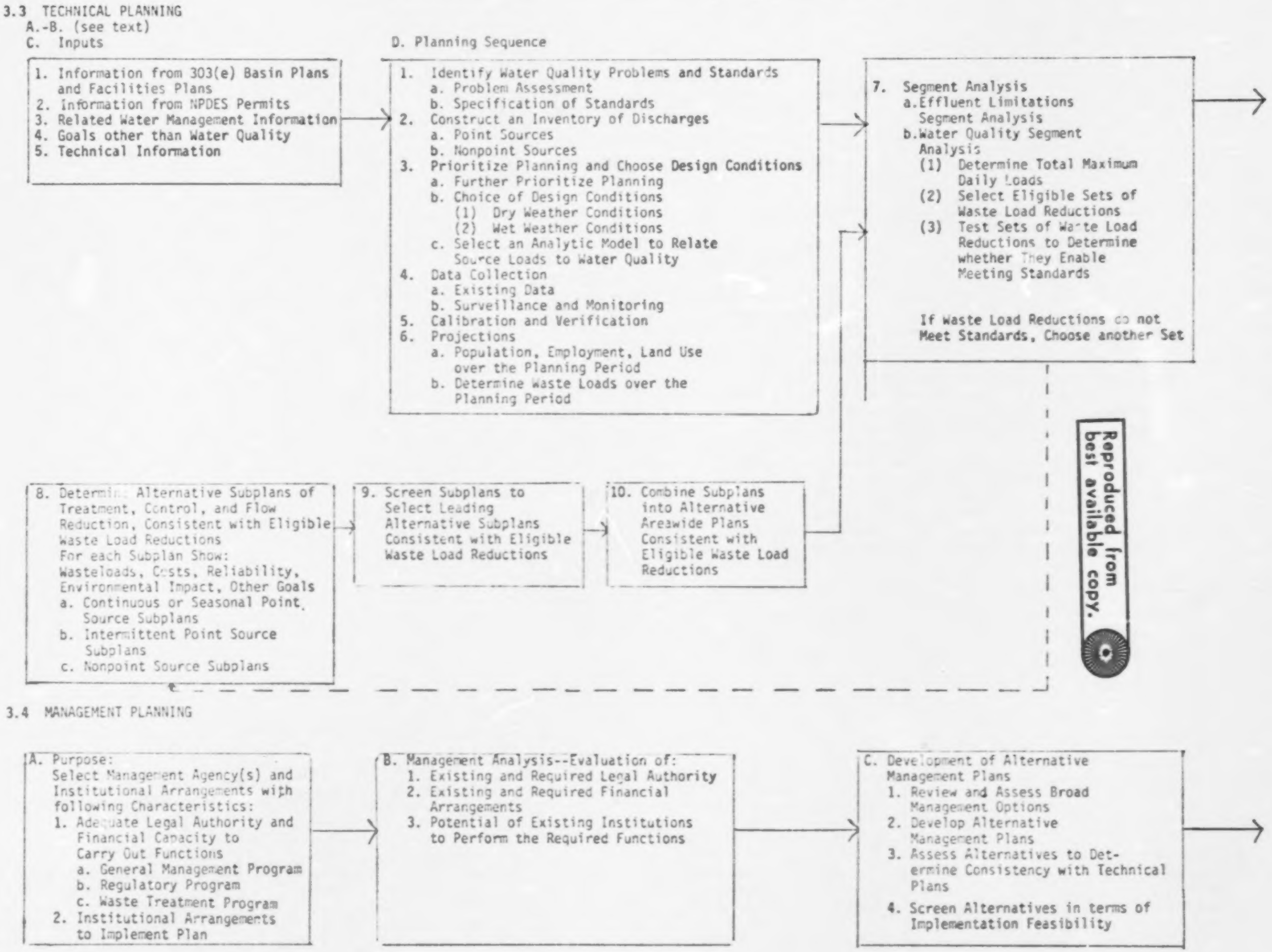
A. Purpose

The purpose of technical planning is to develop a coordinated water quality management strategy for areas that may not be able to meet 1983 water quality goals through application of base level technology. The strategy may be a combination of (1) municipal wastewater treatment systems, (2) industrial wastewater pretreatment or treatment, (3) residual waste management, (4) urban stormwater management, and (5) nonpoint source management. Implementation of these abatement measures is to be achieved through regulatory measures such as local ordinances, capital construction of wastewater treatment facilities, and improved management of stormwater systems.

Since technical planning will be shaped by the particular problems of an area, the procedures in this guideline are offered primarily as an organizational framework for planning. Emphasis accorded each part of the framework will be largely a matter of planning judgment. In developing a water ~~planning~~ management strategy, however, particular attention should be paid to pollution controls other than traditional, capital intensive structural methods.

The technical planning process should be designed so as to place the greatest emphasis on water quality problems that are solvable with existing technology and sources of funding. The water quality problems that should receive the greatest priority initially are municipal and industrial point source problems, and nonpoint source problems that can be dealt with through better management practices and future stormwater systems that can be better designed. Lower

AREAWIDE WASTE TREATMENT MANAGEMENT PLANNING- PLANNING PROCESS FLOW CHART



3.3 TECHNICAL PLANNING
A.-B. (see text)
C. Inputs

1. Information from 303(e) Basin Plans and Facilities Plans
2. Information from NPDES Permits
3. Related Water Management Information
4. Goals other than Water Quality
5. Technical Information

D. Planning Sequence

1. Identify Water Quality Problems and Standards
   a. Problem Assessment
   b. Specification of Standards
2. Construct an Inventory of Discharges
   a. Point Sources
   b. Nonpoint Sources
3. Prioritize Planning and Choose Design Conditions
   a. Further Prioritize Planning
   b. Choice of Design Conditions
      (1) Dry Weather Conditions
      (2) Wet Weather Conditions
   c. Select an Analytic Model to Relate Source Loads to Water Quality
4. Data Collection
   a. Existing Data
   b. Surveillance and Monitoring
5. Calibration and Verification
6. Projections
   a. Population, Employment, Land Use over the Planning Period
   b. Determine Waste Loads over the Planning Period

7. Segment Analysis
   a. Effluent Limitations Segment Analysis
   b. Water Quality Segment Analysis
      (1) Determine Total Maximum Daily Loads
      (2) Select Eligible Sets of Waste Load Reductions
      (3) Test Sets of Waste Load Reductions to Determine whether They Enable Meeting Standards

If Waste Load Reductions do not Meet Standards, Choose another Set

8. Determine Alternative Subplans of Treatment, Control, and Flow Reduction, Consistent with Eligible Waste Load Reductions
   For each Subplan Show:
   Wasteloads, Costs, Reliability, Environmental Impact, Other Goals
   a. Continuous or Seasonal Point Source Subplans
   b. Intermittent Point Source Subplans
   c. Nonpoint Source Subplans

9. Screen Subplans to Select Leading Alternative Subplans Consistent with Eligible Waste Load Reductions

10. Combine Subplans into Alternative Areawide Plans Consistent with Eligible Waste Load Reductions

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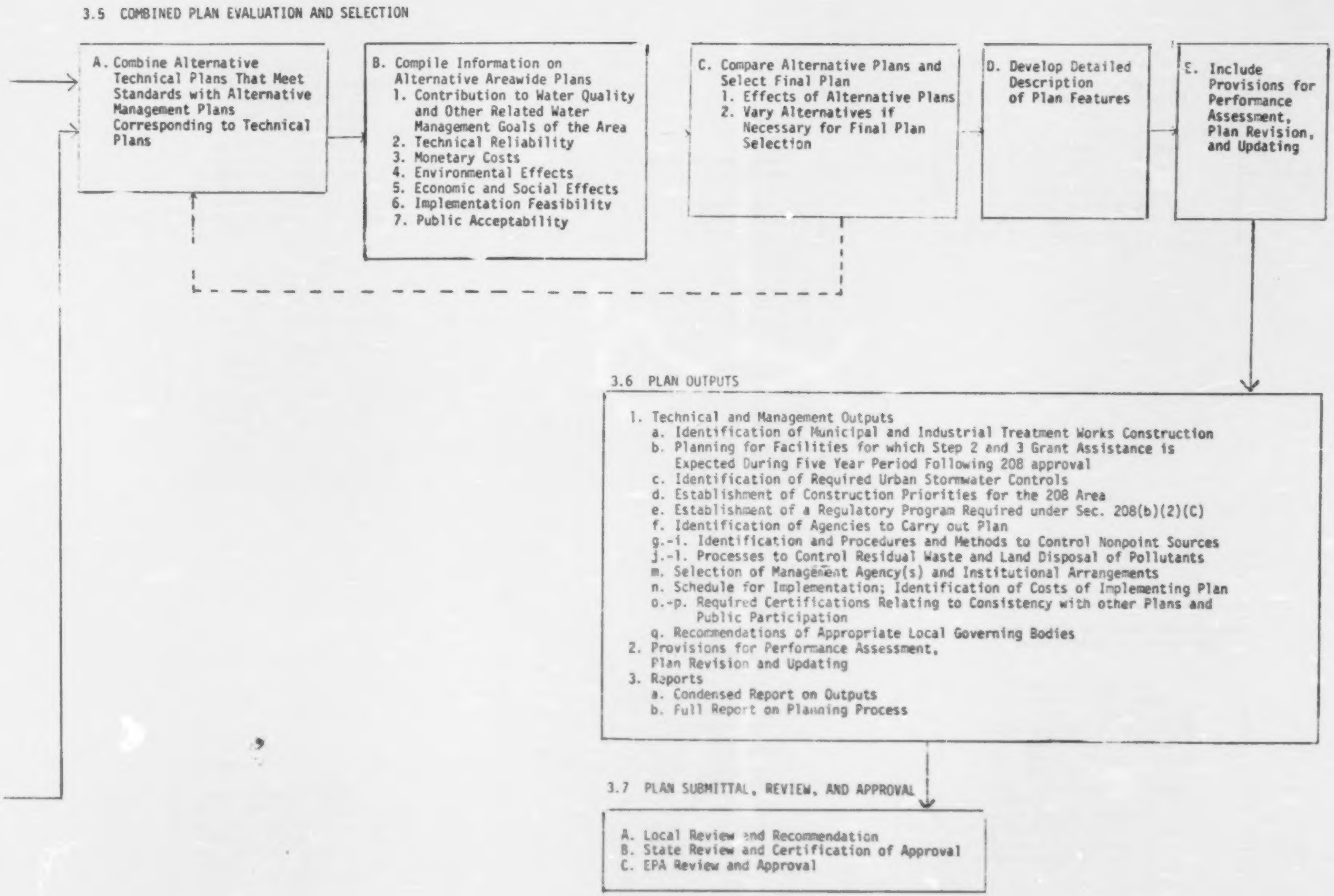
3.4 MANAGEMENT PLANNING

A. Purpose:
   Select Management Agency(s) and Institutional Arrangements with following Characteristics:
   1. Adequate Legal Authority and Financial Capacity to Carry Out Functions
      a. General Management Program
      b. Regulatory Program
      c. Waste Treatment Program
   2. Institutional Arrangements to Implement Plan

B. Management Analysis--Evaluation of:
   1. Existing and Required Legal Authority
   2. Existing and Required Financial Arrangements
   3. Potential of Existing Institutions to Perform the Required Functions

C. Development of Alternative Management Plans
   1. Review and Assess Broad Management Options
   2. Develop Alternative Management Plans
   3. Assess Alternatives to Determine Consistency with Technical Plans
   4. Screen Alternatives in terms of Implementation Feasibility


3.5 COMBINED PLAN EVALUATION AND SELECTION
A. Combine Alternative Technical Plans That Meet Standards with Alternative Management Plans Corresponding to Technical Plans
B. Compile Information on Alternative Areawide Plans
1. Contribution to Water Quality and Other Related Water Management Goals of the Area
2. Technical Reliability
3. Monetary Costs
4. Environmental Effects
5. Economic and Social Effects
6. Implementation Feasibility
7. Public Acceptability
C. Compare Alternative Plans and Select Final Plan
1. Effects of Alternative Plans
2. Vary Alternatives if Necessary for Final Plan Selection
D. Develop Detailed Description of Plan Features
E. Include Provisions for Performance Assessment, Plan Revision, and Updating
3.6 PLAN OUTPUTS
1. Technical and Management Outputs
a. Identification of Municipal and Industrial Treatment Works Construction
b. Planning for Facilities for which Step 2 and 3 Grant Assistance is Expected During Five Year Period Following 208 approval
c. Identification of Required Urban Stormwater Controls
d. Establishment of Construction Priorities for the 208 Area
e. Establishment of a Regulatory Program Required under Sec. 208(b)(2)(C)
f. Identification of Agencies to Carry out Plan
g.-i. Identification and Procedures and Methods to Control Nonpoint Sources
j.-l. Processes to Control Residual Waste and Land Disposal of Pollutants
m. Selection of Management Agency(s) and Institutional Arrangements
n. Schedule for Implementation; Identification of Costs of Implementing Plan
o.-p. Required Certifications Relating to Consistency with other Plans and Public Participation
q. Recommendations of Appropriate Local Governing Bodies
2. Provisions for Performance Assessment, Plan Revision and Updating
3. Reports
a. Condensed Report on Outputs
b. Full Report on Planning Process
3.7 PLAN SUBMITTAL, REVIEW, AND APPROVAL
A. Local Review and Recommendation
B. State Review and Certification of Approval
C. EPA Review and Approval

priority should be placed on nonpoint source and stormwater problems that require large capital investments for their solution. For each type of water quality problem, however, priority attention should be placed on regulatory approaches which will help prevent problems from occurring and thereby lessen the need for remedial pollution abatement.

The technical planning approach in this guideline is based on the Section 303(e) basin planning methodology; a number of cross-references are made to the basin planning guidelines to provide detail on common procedures. However, since existing basin planning is concerned with short-term goals--meeting existing water quality standards and effluent limitations required by July 1, 1977--it is necessary to expand the scope and detail of the 303(e) basin planning methodology to reflect revision to water quality standards, effluent limitations required by July 1, 1983, nonpoint source planning and controls, regional approaches to sewage treatment, sludge disposal, and ground water pollution.

B. Flow Chart

Many of the steps shown in the flow chart correspond to similar planning steps undertaken as part of the Section 303(e) basin plans. The following text elaborates on the meaning of the flow chart and discusses aspects of the Section 303(e) planning methodology which may require greater emphasis in developing a 208 plan.

C. Inputs

1. Information from 303(e) Basin Plans and Facilities Plans

Available information from 303(e) basin plans and facilities plans provide the basic inputs for 208 planning. In cases in which data necessary for developing an adequate 208 plan are not available in the 303(e) basin plan, additional data should be obtained.

Facilities plans under Title II of the Act, or preceding facility plans under 18 CFR and Sec. 3(c) of the Water Quality Act of 1965, should be coordinated with 208 planning as stated in Chapter 2.

2. Information from NPDES Permits

Information on discharges into navigable water available through the National Pollutant Discharge Elimination System (NPDES) should be consulted. Terms and conditions of any permits already issued to dischargers should be accounted for in formulating pollution control strategies for the second round of permits.

3. Related Water Management Information

Much of the information necessary for developing an effective 208 plan may be available from related water management programs and studies. Those which may be especially useful include:

- Basin Studies Under the Water Resources Planning Act
- Urban Studies of the U.S. Army Corps of Engineers
- Flood Plain Information Studies of the U.S. Geological Survey and the U.S. Army Corps of Engineers
- State and Local Water Supply Studies and Data

4. Goals Other than Water Quality

While the 208 plan is concerned with water quality, selection of the final plan may affect other community goals. It is therefore important to establish an understanding of community goals and plans, especially with respect to housing, economic development, transportation, education, recreation, other environmental goals, etc. The relationship between these goals and water quality and other environmental goals should be understood from the outset of the planning process. Public participation in the planning process is an effective way of defining the relationship between community goals.

5. Technical Information

A bibliography of technical studies related to the various parts of this guideline is provided at the end of this document.

D. Specification of Standards

1. Identify Water Quality Problems and Specify Standards for the Planning Period

Since the objective of 208 planning is to achieve the 1983 water quality goals of the Act, an assessment should be made of existing and projected water quality problems which must be solved to meet those goals. Water quality standards which correspond to the goals should then be specified. It is the responsibility of the states to set standards and EPA to review and approve standards. However, the 208 agencies can develop proposals for water quality standards revision.

a. Problem Assessment

An initial assessment of water quality conditions should be made on the basis of existing data and a general familiarity with the planning area. Knowledge of industries, waste treatment, nonpoint source pollution generation, land use, and receiving water quality will aid in this evaluation. This evaluation should not be limited to well-documented conditions for which extensive data exist, nor only to existing conditions, but also should consider trends and future activities which would affect water quality.

b. Specification of Standards

Water quality standards must be reviewed by the states at least once during each three-year period beginning with the passage of the Act. Upon review of standards, recommendation for their revision may be considered and adopted. The 303(e) basin plans will then be revised accordingly during the next basin plan review.

Since 208 planning is concerned with pollution control over a 20-year planning period, control levels should be based on the water quality standards applying over the planning period. In order to develop 208 plans, it is necessary to make assumptions concerning the standards that would be adequate to meet the 1983 water quality goals. Any such assumptions should be made only after consultation with the state and should be made explicit in the plan.

2. Construct an Inventory of Existing and Potential Discharges and Pollutant Sources

a. Point Sources

Discharge inventories provided in relevant basin plans should be reviewed and compared with information provided by the National Pollutant Discharge Elimination System (NPDES) in order to identify and locate all significant dischargers. Special attention should be given to adequacy of information on storm and combined sewer discharges as well as any point source discharges to ground water. If necessary, additional monitoring should be undertaken to update information already available.

b. Nonpoint Sources

It is not anticipated that a complete nonpoint source inventory can be constructed at this stage in the planning process. However, any nonpoint source information available should be assembled as an aid in identifying monitoring and modelling needs. Further nonpoint source identification should be carried out through monitoring and use of generalized prediction techniques (see Chapter 6).

3. Prioritize Planning and Choose Design Conditions and Techniques for Water Quality Analysis

Further analysis of water quality problems and establishment of priorities require both an identification of conditions causing introduction of pollutants into surface and ground water and a description of the physical, chemical, and biological processes which determine the resultant water quality.

Surface waters may be classified as flowing streams, tidal rivers, estuaries, coastal zones, lakes, and reservoirs. Ground water represents a separate category. Since each classification has unique characteristics, the transport and behavior of pollutants should be understood in the context of each type of water body. Within each classification, variation in the action of pollutants may be caused by such factors as topography, geology, hydrology, and meteorology.

In addition to classifying water bodies, sources of pollution can be classified as follows:

- continuous or seasonal point source (example: industrial source discharging continuously or on a seasonal basis)
- intermittent point source (example: storm and combined sewer discharge after rainfall)
- nonpoint source (example: runoff from agriculture, silviculture, construction, and mining)

a. Prioritize Further Planning

Priorities for planning should be established so that further analysis will focus on those pollution problems that can be most effectively solved by intensive management or with existing technology, and sources of funding. At this point in the planning process, the level of detail of analysis for the different water bodies and sources of pollutions should be established. Prioritization should serve as a guide in selecting the sophistication of analytic techniques, need for additional data collection, and need to consider pollution control methods and management alternatives to implement the controls. In general, the level of detail of analysis should correspond to the information needed to resolve pollution problems. High priority problems that can be resolved with existing resources should be analyzed in sufficient detail to enable cost-effectiveness comparison of reasonable alternatives for resolving the problems. Controls that cannot be immediately applied due to lack of availability of funds (treatment of stormwater, remedial nonpoint source controls, etc.) should be assessed in more general terms. The nature and extent of such problems, their impact on water quality, and the rough costs of remedial controls should be assessed. However, any techniques that can be used to better manage existing stormwater and nonpoint source problems without requiring large capital expenditures should be carefully investigated.

b. Choice of Design Conditions

Design conditions are those stream flow conditions which serve as the basis for determining if water quality standards can be met.

A range of flow, temperature, meteorological, and seasonal conditions should be considered in choosing design conditions. In general, for point sources, continuous discharges present the worst pollution under low flow, dry weather conditions. For nonpoint sources transported in runoff, worst conditions will be rainfall-related and may occur under high flow conditions.

Traditional stream analysis often makes use of a low flow-high temperature design condition (e.g., once in 10 year, 7 day low flow). This flow condition may be appropriate for a steady-state stream analysis involving constant rates of point source pollutant discharge. However, choice of design flow conditions for point source analysis should take account of such factors as ice cover and seasonal point source discharge which may cause more severe stress on life in the stream than occurs at low flow.

Wet weather flow conditions may be appropriate for analysis of nonpoint and such intermittent point source discharges as storm sewers. Such factors as intensity and duration of rainfall, time since previous rainfall, pollutant accumulation rates, and stream flow previous to rainfall should be considered in selecting design conditions for nonpoint source analysis.

(1) Dry Weather Conditions

An analysis of the severity of pollution problems associated with dry weather conditions should be conducted. Dry weather flow conditions which are critical for maintaining biological life in the waters should be noted; a design condition for dry weather should be chosen; and its average duration and frequency of occurrence should be specified.

(2) Wet Weather Conditions

A design condition for wet weather flow conditions should be chosen for purposes of waste loads generated under given wet weather conditions. The flow condition should be specified in terms of rainfall intensity, duration, and antecedent conditions specified (e.g., 1/2 inch rain per hour, for two hours, after two weeks of dry weather).

c. Select an Analytic Model to Relate Source Loads to Water Quality

Selection of an analytic model for predicting in-stream water quality from source load information will be influenced by the type of sources and conditions of water quality for which predictions are undertaken. A number of analytical techniques exist for a wide spectrum of conditions. The best technique is the one which can sufficiently relate the resultant water quality to its causes in the simplest manner. Because of the 208 planning time constraint, any proposed analysis should be based on currently available algorithms, techniques, and models. The properties of different analytic models are discussed in Sec. 303(e) guidelines.

Any analysis of the relationships of nonpoint or wet weather sources to water quality should focus on estimating a single gross allotment (target abatement level) for all nonpoint sources contributing to a given water quality segment and estimating the nature and magnitude of the loads associated with each category of nonpoint sources. Since the 208 regulatory and management program for nonpoint source problems is based on establishing Best Management Practices (see Chapter 6) from target abatement levels and relative loads and since the time available for plan development is limited, complicated receiving water modeling to establish the cause-effect relationships between specific nonpoint sources and receiving water quality will not be appropriate.

4. Data Collection

a. Existing Data

Existing data should be evaluated in terms of its adequacy for solving priority water quality problems through application of the simplest analytic techniques possible. Since the initial planning period is short, every effort should be made to make use of existing data before additional data collection is considered.

All relevant existing data should be gathered and summarized, by type of measurement, frequency, time period, and location. Several types of data may be required depending on the analysis:

- Hydrologic
- Hydraulic
- Meteorologic
- Point Source
- Nonpoint Source
- Surface and Ground Water Quality

If water quality problems are characterized by relatively slow changes over time, as in the case of eutrophication and salt water intrusion, they may require long-term data. Other problems, such as dissolved oxygen depletion, which may change in severity over very short periods of time, will require large amounts of data over a short time period. Finally, the data inventory should be used to define calibration and verification periods, as well as the need for additional surveillance and monitoring.

b. Surveillance and Monitoring

Due to the emphasis of 208 planning on nonpoint sources, and due to the adoption of critical water quality conditions that encompass a range of stream flow conditions, it is quite possible that existing data provided in Section 303(e) basin plans will be insufficient to enable prediction of whether segments will meet standards under the assumed design conditions. However, in the case of nonpoint sources, only data necessary to establish Best Management Practices are needed (see Chapter 6). But it will likely be important to establish a continuing monitoring program (as discussed in Chapter 6.4) to assess the effectiveness of Best Management Practice implementation in achieving and maintaining water quality goals.

In the case of developing a nonpoint source monitoring program, it is important to determine priorities for nonpoint source detection. Various approaches for analyzing the extent of the nonpoint source problem are discussed in Chapter 6.

5. Calibration and Verification

Calibration and verification are essential steps in the development of a valid predictive model, capable of describing water quality under the varying conditions of stream flow, temperature, and waste input.

The data inventory should provide information useful for calibration and verification purposes. The data collected through the monitoring and surveillance program should supplement and strengthen the data base.

The calibration procedure should determine the value of the coefficients in the analytical model. These values should then be used to simulate a previous condition, event, or time period, which is independent from the conditions used for calibration.

The interpretation of analyses conducted for various conditions will depend in part on the results of the verification and degree of confidence which exists in the simulation of proposed alternatives.

6. Projections

To plan waste treatment and pollution control over a 20-year period requires assumptions about population, employment, and land use. Based upon those assumptions and estimates of the wasteload generation characteristics of different activities, future pollution control needs can be projected.

a. Population, Employment, and Land Use Over the Planning Period

Estimates of the existing population, employment, and land use in the basin should be assembled as a basis for assessing existing patterns of the generation of pollutants and as a basis for projecting the amount and spatial distribution of future wasteloads. These projections should cover the next 20 years in five-year increments. Particular emphasis should be placed on the effect that implementation of the 208 plan, local growth policies, plans for attainment and maintenance of air quality, and other regional plans for transportation, solid waste management, water supply, or public investment may have on historical trends of population, employment, and land use.

Population data are available from the Bureau of Economic Analysis (U. S. Department of Commerce). They should be updated with the most recent demographic and economic projections developed by the Bureau of Economic Analysis (U. S. Department of Commerce) and the Economic Research Service (U. S, Department of Agriculture) and with projections used as a basis for state planning for air quality management. In general, the SERIES E projections developed by BEA or comparable projections developed by the state should be used as overall growth projections for the planning area. The use of any projections that deviate significantly from BEA should be justified. BEA projections are available for states, BEA economic regions, Water Resource Council Regions, and for Standard Metropolitan Statistical Areas, all of which generally include more than a single county. If it is necessary to disaggregate BEA projections, the assumptions made in the disaggregation process should be made explicit. Historical trends of county population and employment data are available upon request from BEA.

Sources of information on existing and projected land use (shown at a level of detail adequate for relating land use to water quality analysis) are discussed in Chapter 4.

b. Determine Waste Loads Over the Planning Period

By using data on existing population, employment and land use, as well as monitoring information, a materials balance for each significant pollutant should be constructed to relate instream water quality to pollution generation and transport where possible. In the case of nonpoint sources, a materials balance may be based on average factors for wasteload generation per unit of area or unit of activity, or upon data gathered through intensive monitoring, depending on the nature of the problem. (Refer to Chapter 6).

By utilizing the baseline projections and factors of wasteload generation per unit of area or unit of activity, future waste loads may be projected for increments of five years, covering land areas and sources such as residential, commercial, industrial, and nonpoint sources. Disaggregation into more specific land areas and source categories should be undertaken to cover each category for which controls alternatives are considered.

These wasteload estimates and projections may be related to the land use plan for the area so as to show existing and projected wasteload generation for different land uses (see Chapter 4).

7. Segment Analysis

Basin plans provide a system for classifying waters according to whether base level effluent limitations required under the Act will be sufficient to meet the water quality standard in a particular segment of a stream. Where this is the case the segment is classified as "effluent limited"; where higher levels of abatement are needed to meet the water quality standard, the segment is classified as "water quality limited."

It is expected that most stream segments in urban industrial areas undertaking 208 planning will be classified water quality limited at the present time. However, the following factors may influence whether this classification will be appropriate in the future: (1) the stringency of the standards adopted to meet 1983 water quality goals; (2) the change from effluent limitations representing Best Practicable Treatment for point sources and secondary treatment for municipal treatment works to effluent limitations representing Best Available Technology for point sources and Best Practicable Waste Treatment Technology; and (3) the wasteload increases projected for the area. Based on an assessment of these factors, 208 planning should determine in which segments effluent limitations are sufficient to meet standards and in which segments higher degrees of abatement would be necessary to meet standards.

a. Effluent Limitations Segment Analysis

In any segments classified as effluent limited, application of Best Practicable Treatment is required of all point sources, other than publicly-owned treatment works, by July 1, 1977, by which time publicly-owned treatment works are required to apply effluent limitations based on secondary treatment. By July 1, 1983, point sources other than publicly-owned treatment works are to utilize Best Available Technology (BAT), while by such time, publicly-owned treatment works are to utilize Best Practicable Waste Treatment Technology (BPWTT).

In addition to the requirements to meet BAT/BPWTT, any provisions for antidegradation adopted in the basin plan should be applied. (Refer to 303(e) guidelines.)

b. Water Quality Segment Analysis

In segments where effluent limitations are not sufficient to meet water quality standards, an analysis should be carried out to determine the most cost-effective means to reduce wasteloads to the level required to meet standards.

The analysis should be completed for each pollutant which is in violation of water quality standards. Each source contributing that pollutant to the segment should be identified and alternative remedial measures considered. The final control strategy for the segment should reflect a combination of control methods which will meet water quality standards for all pollutants.

(1) Determine total maximum daily loads

Each total load limitation must be at least as stringent as necessary to achieve the applicable standard under the critical water quality conditions prescribed by the standards and any conditions which should be anticipated in the individual situation, such as seasonal waste discharges. It must include provisions for seasonal variation and for a margin of safety which takes into account any lack of knowledge concerning the relationship between effluents and water quality as well as any uncertainty resulting from insufficient data, including data from nonpoint sources. Where thermal standards may be violated, thermal loads must be separately estimated.

It should also be noted that the total maximum daily load to a stream segment is the sum of all individual discharges. In some cases, the total maximum daily load (consistent with meeting water quality standards) can be determined without specifying the location and amount of each individual discharge to the segment. In other cases, due to the characteristics of the water body and the reaction and decay of pollutants in the water, the total maximum daily load must be defined as the sum of individual discharges at given points in the segment.

Total maximum daily load calculations should be differentiated according to stream flow conditions. For each pollutant, a maximum allowable daily load should be specified for (1) dry weather conditions and (2) wet weather conditions.

In calculating the maximum allowable daily load of pollutants, a gross allotment between point sources and nonpoint sources should be determined for each design flow condition. The allotment for intermittent point and nonpoint sources should be used to determine target abatement levels for various categories of nonpoint sources. (See Chapter 6.)

(2) Select eligible sets of wasteload reduction consistent with options

The wasteload allocation procedure involves calculation of the waste reduction needed from each continuous point source discharger to meet the water quality standard. Eligible sets of wasteload allocations should be chosen from the abatement options for continuous point sources. (See Chapter 3.3.D.8.)

Refer to 303(e) guidelines for a basic explanation of wasteload allocation procedure. The following are special considerations for determining wasteload allocations in complex urban industrial areas:

- The number of alternative sets of wasteload allocations should be sufficient for thorough comparison of alternative means of achieving water quality standards according to the criteria of cost-effectiveness.

- In general, continuous point source wasteload allocation will be based on the low flow condition. Nonpoint source and intermittent point source target abatement levels will be based on the incremental load resulting from rainfall-related flow conditions from nonpoint sources, when point sources have been controlled.

Calculations of wasteload reduction for intermittent point and nonpoint sources should be made in order to determine how best to meet target wasteload reductions for these sources. Methods for predicting wasteloads from these sources are discussed in Chapter 6. The purpose of these calculations is to choose the Best Management Practices for intermittent point and nonpoint source categories from the available options (see Chapter 3.3.D.8), rather than to assign a quantitative load reduction to individual dischargers. Thus, the calculations should be made for categories of sources and should be based on best estimates of loading from these sources.

(3) Test sets of wasteload reductions to determine whether they enable meeting standards

The analytic model discussed earlier in this chapter should be used to determine whether wasteload allocations for continuous point sources enable meeting standards. For a discussion of the tolerance level to be used in that prediction, refer to Section 303(e) guidelines. The choice of a tolerance level and the rationale for that choice should be explicitly stated.

It is not necessary and probably not feasible to attempt to model the receiving water impact of these load reductions, as this may require highly sophisticated analytic modeling and more extensive data requirements than can be met during the 208 planning period. It is only necessary to determine whether the predicted load reductions for intermittent point and nonpoint sources enable meeting the single gross allotment or target abatement level for these sources.

Because some proportion of wasteloads may be reserved to allow for future growth in the area, it is important that the wasteload allocation process be undertaken in close coordination with agencies possessing land use planning and control authority. Management of new wasteload discharges in the area should be carried out through the regulatory program for implementing the plan (see Chapter 7).

8. Determine Alternative Subplans of Treatment, Control and Flow Reduction Consistent with Eligible Wasteload Reductions

Wasteload reduction sets should be prepared in conjunction with detailed development of alternative controls for point and nonpoint sources.

Chapters 5 and 6 provide a framework for developing pollution control options for point and nonpoint sources. The alternatives that are presented as the result of detailed planning for point and nonpoint sources are referred to as subplans.

In order to develop subplans it is helpful to examine the patterns of existing and projected wasteloads by display on land use maps. Alternatives for point and nonpoint source control, and means to implement these controls may be developed through an examination of alternative land use and land management practices. (See Chapter 4.)

Subplans may be broken into three major types according to the category of sources and design conditions to which they apply.

a. Continuous or Seasonal Point Source Subplans

Continuous point sources are municipal treatment works and industrial point sources. Some industrial point sources may discharge on a seasonal basis. Detail on preparing this subplan is provided in Chapter 5.

b. Intermittent Point Source Subplans

Intermittent point sources are wet weather related point sources such as storm and combined sewer overflows. Details on preparing this subplan is provided in Chapter 5.

c. Nonpoint Source Subplans

Nonpoint sources are primarily wet weather related. Detail on preparing this subplan is provided in Chapter 6.

Each subplan should furnish information on the following:

- Wasteload characteristics of each alternative expressed in appropriate units;
- Total cost of each alternative expressed as its present value or average equivalent value of capital and operating costs for the overall alternative and subsystem components;
- Information on the reliability of each alternative and subsystem included in each alternative;

- Significant environmental effects of each alternative consistent with NEPA procedures, including a specific statement on future development impact;
- Contribution of each alternative to other water-related goals of the planning area.

9. Screen Subplans to Select Leading Alternative Subplans Consistent with Eligible Wasteload Reductions

Control options under each subplan are numerous. Thus, the number of possible subplans may be so great as to impede consideration of logical alternatives. Since the only subplans that are viable are those which the management agency(s) can implement, it is important at this stage to integrate the results of management planning with those of technical planning.

10. Combine Subplans into Alternative Plans Consistent with Eligible Wasteload Reductions

At this step, viable subplans should be combined into alternative areawide technical plans for final evaluation and selection. This is not meant to preclude reconsidering options previously screened out, but merely to provide a convenient form of organizing a vast number of potential control alternatives into a reasonable number to evaluate.

3.4 Management Planning

A. Purpose

The key implementation and enforcement provisions of Section 208 are delineated in Section 208(b)(2)(C) and (c)(2) of the Act. The Act requires that authority to carry out the above provisions be vested in a designated agency or agencies within a 208 area. The purpose of management planning is to select a management agency or agencies and to develop appropriate institutional arrangements through which the plan can be implemented. Institutional arrangements for areawide waste treatment management are the formal structure of affected state and local units of government for planning and implementing an areawide water quality management plan.

The Act clearly specifies the responsibilities and functions of the management agency(s). The criteria that should be used to determine whether the management agency(s) can properly carry out these responsibilities are:

- adequate legal authority
- adequate financial capacity

The Act does not, however, stipulate what institutional arrangements should be utilized to enable plan implementation. Criteria for evaluating the adequacy of the management agency(s) and institutional arrangements should be:

- Practicability -- To what extent do institutional arrangements rely on existing water quality management agencies? Are the institutional arrangements politically feasible?

- Managerial Capacity -- To what extent do institutional arrangements provide for program oversight including procedures for resolving conflicts and cooperating with other areawide planning activities?

- Public Accountability -- To what extent do institutional arrangements provide for a decision-making process accountable to the area electorate?

1. Functions of Management Agency(s)

To ensure plan implementation, the management agency(s) and the supporting institutional arrangements need to carry out the following functions:

a. General Management Program

One of the most important functions of the 208 management agency(s) is to provide general direction for the implementation of the plan. The management responsibilities involved in directing plan implementation should include:

(1) program supervision and coordination, e.g., ensuring that the 208 program is being implemented, that the program is being coordinated with other programs in the area, and that the performance of the program is being continually assessed;

(2) continuous planning, e.g., updating the areawide plan and implementation mechanisms as required by changing conditions;

(3) fiscal management, e.g., assuring that adequate resources are provided to implement the regulatory and waste management programs as well as to finance the administration and continuous planning functions of the management agency(s).

Further detail on the managerial functions of 208 agencies is provided in Chapter 7.

b. Regulatory Program

Authority to carry out the regulatory program mandated in Section 208(b)(2(C) is required. In addition to authority to regulate existing and new pollution sources, administrative procedures and agencies responsible for implementing the regulation need to be specified. The regulatory program should be the vehicle for enforcing the abatement measures that have been developed through the technical planning process. In addition to direct regulation, appropriate tax policies should be developed to complement the regulatory program. Further detail on designing a regulatory program is provided in Chapter 7.

c. Waste Treatment Program

The legal authority and financial capacity needed for operating, maintaining, and constructing waste treatment works and otherwise carry out a plan is described in Section 208(c)(2) of the Act. A waste treatment program includes all the capital construction responsibilities to carry out a 208 plan, such as publically owned treatment works as well as all other public sector programs for abating pollution including residual waste management, stormwater management, and nonpoint source management. Detail on the waste treatment program is provided in Chapter 7.

2. Institutional Arrangements Capable of Implementing the Plan

The great variety of local institutions, practices, and experience dictates that a pragmatic strategy be followed in formulating institutional arrangements. The arrangements may be comprised of one or more agencies, which may be existing or newly created and local, regional, or statewide in jurisdiction, and may also rely on intergovernmental agreements. Although care should be taken to ensure that the institutional arrangements fit the local situation, excessive fragmentation of authority and responsibility should be avoided. Optional approaches are discussed in Chapter 7.

The greater the number of agencies involved in implementing the plan, the greater the need to coordinate between the agencies. The role of various levels of government, the A-95 review process, and the state is discussed in Chapter 7.

The complexity of institutional arrangements should not prevent a clear delineation of the decision-making process used to implement the plan. In particular, there should be an explicit arrangement for ensuring overall supervision and enforcement of the management plan. Requirements for public participation in EPA programs and means for providing public participation in 208 planning are discussed in Chapter 10.

B. Management Analysis

The initial step in the management planning process should be an analysis of the area's experience in water quality management. The purpose of this analysis will be to evaluate the capability within the area to meet the management requirements of Section 208 and to develop an understanding of what is needed to satisfy these requirements. Some of the analysis will have been accomplished in the designation and grant application stages. During the planning process, this preliminary assessment should be reviewed and, where necessary, expanded to assure its accuracy and thoroughness. The following analyses should be provided:

1. An assessment of the specific legal authority required under Subsection 208(c)(2) and 208(b)(2)(C) to carry out the regulatory and waste management programs and an approach for acquiring such authority. The approach should delineate what enabling or supplemental legislation would be necessary, the type of contractual agreements that might be employed, and the possibility for adapting to existing laws. In instances where existing laws might be broadly interpreted as furnishing the required authority, but where such interpretation may be subject to dispute, it would be best to seek specific statutory sanction.

2. An evaluation of existing financial arrangements to determine what changes will be necessary to provide affected agencies with the capacity to meet financial needs and obligations for carrying out general management responsibilities, the regulatory program and waste management program.

3. An assessment of the potential of existing institutions in the area to perform the required functions. An overall assessment should be made of the area's potential for regional water quality management. This evaluation should seek to assess the effectiveness of regional management to date and the strength of the area's traditions and commitment to regional approaches. The evaluation should incorporate an appraisal of the relationships between federally funded regional planning authorities and regional or local water quality management agencies such as transportation, land disposal of wastes, land use planning, and water supply where such agency activities affect water quality. The purpose of the evaluation is to help ensure that implementation plans are constructed on a realistic foundation which reflects the area's experience in regionalized management.

C. Development of Alternative Management Plans

Upon completion of the management analysis, alternative management plans reflecting the results of this analysis should be developed. In most cases, only a limited number of alternatives will be appropriate. Close coordination with the technical planning component of the planning process will be necessary throughout this stage to ensure that the management alternatives developed are consistent with alternative technical plans. As an initial step in the formulation of management alternatives, the broad options available should be reviewed and assessed. Careful consideration should be given to the advantages and constraints of these options in relation to the designated areas. Once developed, the implementation alternatives should be screened in terms of their feasibility according to the criteria discussed previously. An overall assessment of the implementation feasibility of the alternatives for management agency(s) and institutional arrangements should be based on all the criteria discussed.

3.5 Combined Plan Evaluation and Selection

A. Combine Alternative Technical Plans that Meet Standards with Alternative Management Plan Corresponding to Technical Plans

Technical and management planning should yield a series of technical plans for which an alternative management plan to implement the technical plan has been presented. At this step, the alternative technical plans and management plans should be simply combined.

For each alternative technical and management plan that are combined into alternative areawide plans, sufficient detail concerning the schedule of actions to be undertaken should be provided to enable accurate evaluation of the plan in terms of meeting 1983 water quality goals.

B. Compile Information on Alternative Areawide Plans

The following information on the plans should be assembled for comparison of alternatives:

1. Contribution to Water Quality and Other Related Water Management Goals of the Area. (Information from Chapters 4, 5 and 6)
2. Technical Reliability (Information from Chapters 5 and 6)
3. Monetary Costs (Information from Chapters 5 and 6; methodology for cost evaluation provided in Chapter 9)

4. Environmental Effects (Information from Chapters 5 and 6; methodology for environmental evaluation provided in Chapter 11)

5. Economic and Social Effects (Methodology for evaluation of economic and social effects provided in Chapter 11)

6. Implementation Feasibility (Information from Chapters 7 and 8)

7. Public Acceptability (guidance on means to assure public involvement in the planning process provided in Chapter 10)

Much of the above information will have been developed in the planning process; that which has not should be compiled in order to be able to proceed to final plan selection. Information may be conveniently assembled on tables like those presented in Chapter 12.

The format and procedures provided in Chapters 11 and 12 for compiling information on alternative plans are specifically designed to fulfill the need for the applicant to prepare an environmental assessment on the 208 plan.

C. Compare Alternative Plans and Select Final Plan

1. Effects of Alternative Plans

Comparison of alternatives and selection of a final plan should be the product of public deliberation over the merits of the various plans under consideration. A discussion of means to involve the public in the overall planning process is provided in Chapter 10. Suggested procedures for public involvement in selection of the final plan are provided in Chapter 12.

2. Vary Alternatives if Necessary for Final Selection

To achieve the most desirable overall plan, a variant or composite of plans originally proposed could be considered.

D. Develop Detailed Description of Plan Features

In the process of screening, evaluating, and selecting plans, features of the plan may not have been developed in sufficient detail. At this step, the timing and detail of the plan should be finalized. A critical path chart may be a useful format for depicting the sequence of plan implementation.

E. Include Provisions for Performance Assessment, Plan Revision, and Updating

The 208 plan, which covers a 20-year period, should be updated as necessary, and must be certified annually by the governor. Procedures for performance assessment and updating both technical and management features of the plan are to be specified in the initial plan submittal.

3.6 Plan Outputs

1. Technical and Management Outputs

The major technical and management elements of a 208 areawide waste treatment management plan have been summarized in Chapter 1.5. Table 3.1 found on page 3-24 of this chapter delineates specific elements or outputs which may be included in a 208 plan to satisfy each requirement of the regulation (40 CFR, Part 35, Subpart F). The table also relates each element to parts of this guideline which contain an explanation of the type of analysis and planning considerations that could be followed to produce the specific elements.

The review and approval of 208 plans by the states and EPA will be based on the finding that the requirements of the 208 regulations (40 CFR, Part 35, Subpart F) have been met. In making their determination that these requirements of the regulation have been met, the states and EPA will compare outputs with those required by checking the list of specific elements. Further detail on plan review and approval procedures is provided in Chapter 14.

The timing for implementation of the plan should be shown in conjunction with the plan contents.

2. Provisions for Performance Assessment, Plan Revision, and Updating

The provisions for performance assessment, plan revision, and updating should describe procedures for assessing the progress of plan implementation and for modifying specific plan elements, and where possible, provide alternatives in the event that an original course of action proves infeasible or inadvisable in light of changed conditions.

Since procedures for revision and updating cannot provide for all possible contingencies, it is not intended that specific alternatives to the initial plan be investigated in detail. On the other hand, alternatives that have been investigated in formulating the initial plan may be cited as generalized contingency measures to be further investigated in the event of plan revision.

3. Reports (Also see Chapter 13).

a. Condensed Report on Outputs

A condensed report on the plan should cover all the plan elements, relating them to an implementation schedule.

b. Full Report on the Planning Process

Certain provisions of the interim grant regulations (40 CFR 35 Subpart F) require documentation of how the planning process was conducted and how plan alternatives and environmental impact were assessed. For example, §1064-1 (1) and §1064-1(o) necessitate a demonstration of the adequacy of the plan to meet water quality objectives; §1064-1(m-n) require documentation on alternative management arrangements for implementing the plan, as well as information on the environmental, social and economic impact of alternatives.

A report documenting how the plan was developed and its likely impact is therefore needed to satisfy these and other requirements of the regulation. For purposes of clarity, the report on the planning process should be systematic and deal with each step of the process. The format of the report could follow the outline of the planning process presented in this guideline. Various sections of the report could then be referred to as meeting the requirements of the regulation discussed above. The documentation of the environmental impact of alternative plans called for in 3.5.B. of this chapter should satisfy the NEPA requirements for an environmental assessment of 208 plans as required in 40 CFR Part 6.

3.7 Plan Submittal, Review, and Approval

The procedures for local government review and recommendation, state review and approval, and EPA review and approval of completed 208 plans are described in Chapter 14. These procedures take place after a completed 208 plan, including reports on plan outputs and planning process, has been completed. The review and approval process may result in recommendations for change in the plan or report.

TABLE 3.1

Major Elements of a 208 Plan	Plan Contents Specified in Interim Grant Regulations	Elements which might be in a Plan to Satisfy Each Requirement of the Regulation	Major References in Guidelines
I. Municipal and Industrial Treatment Works Program (including assessment of needs and priorities, elements of planning, and management agency(s) to implement)	(a) An identification of the anticipated municipal and industrial treatment works construction necessary to meet the requirements of Title II of the Act within the designated planning area over a twenty year period.	(a)(1) facilities planning: · definition of service areas · routes, sizes, capacities, critical elevations, lengths, and flows of sewage collection systems, except those at or below the trunk line size · location, capacity, type, and level of treatment, (corresponding to waste load allocations) and preliminary identification of residual waste disposal options · preliminary schedules and cost estimates of needed construction and economic, social, and environmental impact information (also required under (n) below)	Ch 3.3 Ch 4. Ch 5.2
		(a)(2) industrial and private domestic wastewater: · for private domestic wastewater treatment plants: ·· an identification of service areas and collection systems, except those at or below trunk line size · for industrial waste treatment and domestic wastewater treatment plants: ·· an identification of location of treatment plants, capacity, type, level of treatment (corresponding to waste load allocations), preliminary identification of residual waste disposal options, and schedule of discharge to receiving waters or to municipal treatment plants ·· a preliminary cost estimate for treatment levels needed to meet applicable effluent limitation requirements of the Act, or to meet water quality standards, and economic, social, and environmental impact information regarding such treatment (also required under (n) below)	Ch 5.2 Ch 5.3 Ch 5.5 Ch 5.6
	(b) Those portions of facilities planning in compliance with §35.917-1(a)-(i) the costs of which are allowable under §35.1062 for those facilities for which Step 2 or Step 3 grant assistance is expected to be awarded during the five-year period following the section 208 plan approval.	(b) · refer to statement of relationship between facilities planning and areawide planning. (Ch 2)	Ch 2.
II. Urban Stormwater Management Program	(c) The identification of required urban storm water runoff control systems;	(c)(1) · an analysis of the magnitude of existing and anticipated urban stormwater problems including those resulting from combined sewer overflows	Ch 5.4 Ch 4. Ch 6.4
		(c)(2) · a specification of measures to be undertaken either to better manage existing storm and combined sewer systems and prevent entry of pollutants to such systems, or to provide for storage and treatment of such runoff	Ch 5.4 Ch 6.5
		(c)(3) · specification of performance criteria for new construction of urban stormwater systems, so as to minimize any stormwater problems	Ch 6.2 Ch 6.5
I. Municipal and Industrial Treatment Works Program (continued)	(d) The establishment of construction priorities for treatment works for the five-year period following the year of plan approval and a proposed schedule of completion of major treatment works over the twenty-year period following submission of the plan;	(d) · preliminary schedules for facilities construction, based on facilities planning described in (a) above · documentation of the priority of the proposed facilities on the State Priority List	

NOTE: The elements of a 208 plan described in this table may be categorized as proposed actions (pollution control measures, institutional and financial arrangements) or analyses used to develop or justify the proposed actions. The proposed actions should be summarized in a condensed report on outputs of the selected plan (see Chapter 13.3) and the analyses, demonstrations of water quality impact, adequacy of regulatory measures, and environmental assessment should be included in a full report on the planning process (see Chapter 13.3).

TABLE 3.1

Major Elements of a 208 Plan	Plan Contents Specified in Interim Grant Regulations	Elements which might be in a Plan to Satisfy Each Requirement of the Regulation	Major References in Guidelines
III. Regulatory Program (for (1) existing sources, (2) new sources and (3) pretreatment, including implementation mechanisms such as permits, ordinances, land use controls, etc.)	(e) The establishment of a regulatory program to: (1) Provide that waste treatment management shall be on an areawide basis and provide identification and evaluation of and control or treatment for all point and nonpoint sources of pollution, including inplace or accumulated pollution sources, as shall be required under guidelines published by the Administrator pursuant to sections 208 and 304(e) of the Act. (Special regulatory consideration, including land use controls, is required for sources further specified under paragraphs (g) through (l) of this section	(e)(1) · demonstration that management agency(s) recommended to implement plan have authority and capability specified in §208(c)(2) to provide waste treatment management on an areawide basis	Ch 3.4 Ch 7.8
		· demonstration that planning process has identified and evaluated all sources of pollution in the area and developed appropriate control alternatives for existing and potential forms of pollution, including waste load reduction levels consistent with meeting and maintaining 1983 water quality goals (also required under (O) below). - For each category of pollutant sources identified in the planning process (including nonpoint source categories in (g)-(l)), identification of corresponding controls included in the initial plan	Ch 3.3, 3.5 Ch 4. " "
		·· demonstration that an adequate regulatory program for each category of pollutant sources identified in the planning process is included in the plan, by documenting: - conditions and situations in which regulation applies, including abatement requirements - parties affected by regulation - timing of regulation, notice, and hearings - legal form of regulation e.g., activity permits, land use controls, zoning, building codes, licensing of pollutant generating activities, conservation plans, etc. - legal authority for regulation; adequacy of exist- law or proposed new regulation - agencies responsible for implementing regulation, agency staffing and funding for programs - methods of enforcement and compliance monitoring	Ch 7.
	(e)(2) Regulate the location, modification, and construction of any facilities within such area which may result in any discharge in such area including as appropriate, regulation of any future increase in waste loads and sources; and	(e)(2) · For each category of pollutant sources identified in the planning process, including nonpoint source categories in (g-l), identification of controls proposed for projected new sources from each category	Ch 3.3, 3.5 Ch 4. Ch 7.
		· demonstration that an adequate regulatory program for category of new pollutant sources projected in the plan, is included in the plan (same documentation as (e)(1)).	Ch 7.3
	(e)(3) Assure that any industrial or commercial wastes discharged into any publicly owned treatment works in such area must meet applicable pretreatment requirements established in the plan.	(e)(3) · demonstration that pretreatment requirements of §307 of the Act will be met	Ch 5.
		· demonstration that implementation of §307 requirements and other requirements proposed in the plan will allow proper functioning of facilities proposed in (a) and wasteload reductions documented in (e)(1)	Ch 3.3 Ch 5.
		· demonstration that an adequate regulatory program exists for implementing §307 and other pretreatment requirements (same documentation as (e)(1))	Ch 7.

TABLE 3.1

Major Elements of a 208 Plan	Plan Contents Specified in Interim Grant Regulations	Elements which might be in a Plan to Satisfy Each Requirement of the Regulation	Major References in Guidelines
VI. Management Program to Implement I-V (including legal authority and financial arrangements)	(f) The identification of those agencies necessary to (1) construct, operate, and maintain all facilities required by the plan, and (2) otherwise carry out the plan;	(f)(1) · identification of management agency(s) to exercise responsibility or supervision over construction, operation, and maintenance of facilities identified in (a)	Ch 3.4 Ch 7.
		(f)(2) · identification of management agency(s) to exercise responsibility over all other elements of the plan	" "
IV. Nonpoint Source Management Program (including planning and controls for agriculture, silviculture, mining, construction, hydrologic modification, salt water intrusion)	(g) A process to (1) identify, if appropriate agriculturally and silviculturally related nonpoint sources of pollution, including runoff from manure disposal areas, and land used for livestock and crop production, and (2) set forth procedures and methods (including land use requirements) to control to the extent feasible such sources: (h) A process to (1) identify, if appropriate, mine-related sources of pollution including new, current, and abandoned surface and underground mine runoff, and (2) set forth procedures and methods (including land use requirements) to control to the extent feasible such sources; (i) A process to (1) identify construction activity related sources of pollution, and (2) set forth procedures and methods (including land use requirements) to control to the extent feasible such sources;	(g-j)(1) · demonstration that the planning process adequately identifies each of the specific nonpoint source categories in the area in terms of relative magnitude, extent, and occurrence of pollutant loads	Ch 3.3 Ch 4. Ch 6.
		· demonstration of compatibility between pollutant reduction levels established for any nonpoint source category and basin plans	Ch 3.3
		(g-j)(2) · identification of control measures for each nonpoint source category that are needed to control existing nonpoint sources so as to meet target reduction of pollutants	Ch 3.3 Ch 6.
		· identification of control measures for each nonpoint source category needed to prevent increase pollution from nonpoint source generating activities	Ch 6.1
		· for each nonpoint source category, identification of corresponding regulatory program under (e)(1) for existing sources and (e)(2) for new sources	Ch 7.
	(j) A process to (1) identify, if appropriate, salt water intrusion into rivers, lakes and estuaries resulting from reduction of fresh water flow from any cause, including irrigation, obstruction, groundwater extraction and diversion, and (2) set forth procedures and methods to control such intrusion to the extent feasible where such procedures and methods are otherwise a part of the waste treatment management plan;		
V. Residual Waste Management Program	(k) A process to control the disposition of all residual waste generated in such area or imported into such area which could affect either surface or groundwater quality; (l) A process to control the disposal of pollutants on land or in subsurface excavations within such area to protect ground and surface water quality;	(k-l) · provisions for utilization or disposal of residual wastes from municipal industrial and private facilities should be included in (a)	Ch 5.
		· identification of all existing and proposed residual waste, land, and subsurface disposal sites in area	Ch 4.
		· demonstration that the planning process includes an analysis of wasteloads generated from residual waste disposal sites	Ch 3.3 Ch 4.
		· identification of control measures needed for existing residual waste, land, and subsurface disposal sites,	" "
		· identification of control measures for new residual waste, land, and subsurface disposal sites, needed to regulate future increases in wasteloads from such sites	Ch 6.
		· for each control measure above, identification of corresponding regulatory program under (e)(1) for existing sources and (e)(2) for new sources	Ch 7.

TABLE 3.1

Major Elements of a 208 Plan	Plan Contents Specified in Interim Grant Regulations	Elements which might be in a Plan to Satisfy Each Requirement of the Regulation	Major References in Guideline
VI. Management Program to Implement I-V (continued)	(m) The identification of all major alternative measures, including enforcement activities, financing, land use and other development controls and regulatory actions, administrative and management authorities and practices necessary to carry out each of the alternatives, and selection of the recommended system;	(m) · identification of each major alternative (including alternative sub-plan elements) to the initial plan developed in the planning process	Ch 3.5
		· for each major alternative identified, identification of authority and financial requirements needed on the part of management agency(s) to implement the plan--specifically the authority outlined in §208(c)(2) of the Act, as well as authority over land use and development and regulation of nonpoint source pollution	Ch 3.4 Ch 7. Ch 8. Ch 12.
VII. Environmental Assessment of I-VI	(n) The period of time necessary to carry out the plan and major alternatives, the costs of carrying out the plan and major alternatives within such time, and economic, social and environmental impacts of carrying out the plan and major alternatives within such time;	(n) · environmental assessment of the initial plan, and major alternatives developed in the planning process including identification of: - plan schedule - effectiveness in meeting water quality goals - direct costs - social, economic, environmental impact	Ch 3.5 Ch 11.
VIII. Recommendations and Certifications (consistency with basin plans, public participation, plan recommendation)	(o) Certification of the consistency of the plan with plans prepared or in preparation under sections 209 and 303 of the Act. (Any 201 plan developed in the area or any application for a Step 1 grant for such plan received prior to the approval of the 208 plan shall require review and comments by the designated 208 agency which shall be transmitted to the State agency processing the Title II grant applications. After the section 208 plan has been approved, all 201 plans for the area that may previously have been developed shall be brought into conformance with the 208 plan.)	(o) · water quality analysis as specified in Ch. 3.3, sufficient to demonstrate than plan will enable meeting 1983 goals and standards adopted by State	Ch 3.3 Ch 13.
		· certification by the State that 208 plan is compatible with existing or proposed basin plans and revisions thereof	Ch 3.3
		· interim 208 outputs as specified in Ch. 2 of guidelines	Ch 2.
	(p) Certification and description of public participation, in the planning process and adoption of the plan, in accordance with Part 105 of this Chapter and	(p) · see Part 105 regs	Ch 10.
		· document how public participation has been carried out in accordance with Part 105 regulations	
	(q) Recommendations by governing bodies of local governments having responsibility for, or which would be directly affected by, implementation of the plan and having jurisdiction in the planning area as to State certification and EPA approval of the plan. In the event that a local unit of government fails to provide a recommendation within 30 days of receiving such a request from the planning agency it shall be considered that the plan has been favorably recommended by that unit of local government	(q) · self explanatory	Ch 14.

CHAPTER 4

DETAILED CONSIDERATIONS FOR LAND USE

4.1 Introduction

Since water quality is one of a series of economic, social, and environmental objectives which may be considered when making land use decisions, the 208 planning agency must be fully aware of planning and implementation programs designed to achieve these and other objectives of the 208 area. Of particular importance are planning efforts which may be ongoing during the development of the 208 plan. This could include land use, coastal zone management, and air quality maintenance planning. The 208 planning agency must work closely with agencies responsible for other planning and implementation programs to ensure that plans are compatible and that the implementation of other plans and programs does not have an adverse impact on carrying out the 208 plan.

This chapter discusses how land use plans, projections, and controls should be assessed, revised if necessary, and utilized to help attain water quality objectives. A detailed consideration of land use is important for two reasons: (1) land use plans can serve as bases from which point and nonpoint source controls can be developed and evaluated; and (2) possible changes in future development patterns can be explored as a means of reducing investment in point and nonpoint source control. Because of the strong relationships with point and nonpoint source subplans, the land use analyses described in this chapter should be done in close conjunction with these subplans.

4.2 Pertinent Authorizations and Purpose

Section 201(c) authorizes, to the extent practicable, the "control or treatment of all point and nonpoint sources of pollution . . . ." This implies a need for considering land use controls and land management practices as a means for nonpoint source control.

Section 208(b)(2)(C)(ii) provides that the areawide waste treatment management plan include "the establishment of a regulatory program to regulate the location, modification, and construction of any facilities within such area which may result in any discharge in such area . . . ." This provides authority for the 208 management agency(s) to regulate location of new pollutant dischargers by determining the location of municipal treatment facilities, by seeking control of other pollutant sources, and by seeking appropriate changes in land use plans and controls from the agencies possessing land use jurisdiction in the 208 area. The term "facilities" in the above citation includes any controllable source of pollutants, the regulation of which contributes to attaining water quality standards.

More explicit authority for the 208 plan to consider land use in the 208 area is provided in Section 208(b)(2)(F-H) which states that the plan will set forth procedures and methods including "land use requirements" to control to the extent feasible certain nonpoint sources of pollution. The term "land use requirements" in Section 208(b)(2)(F-H) includes those land use controls (legally permitted uses) and those land management regulations (regulation of activities conducted on land) which contribute to the attainment of water quality standards.

4.3 Incorporating Land Use Considerations in the 208 Planning Process

A. Introduction

This section identifies various methods of land use control which the local governments and the management agency(s) in the 208 area can utilize to regulate pollution. This will enable the 208 area to make tradeoffs between structural solutions (e.g., treatment facilities) and nonstructural solutions (e.g., alternative land uses), thus increasing the flexibility in the choice of methods to achieve water quality standards.

Throughout the process of incorporating land use considerations into the 208 plan, primary reliance should be placed on utilizing existing land use plans, projections, and controls, although it will be necessary in some cases to identify necessary revisions to incorporate changes responsive to water quality objectives. Since it is unlikely that the 208 planning agency will have the authority to enact or implement changes in land use controls, it is essential that the planning agency work closely with those government agencies possessing legal authority for land use planning and control. This will be necessary to assure that the management agency(s) has the authority to implement the plan.

It is also possible that some jurisdictions within the 208 area will not have land use plans, projections, and/or controls. In this case, the 208 agency should work with the appropriate jurisdictions to gather enough information about the area so that current and future development patterns, densities, and policies can be identified. If it is determined that revisions in these patterns, densities, and policies are necessary to achieve water quality standards in a cost-effective manner, the 208 planning agency must work closely with the appropriate jurisdictions possessing legal authority to enact and implement such revisions.

The major outputs of the procedure outlined in this chapter are land use plans, projections, and an identification of land use controls and practices necessary to successfully implement the plans. These should be of sufficient detail so that nonpoint source runoff can be evaluated, and so that the location, volume, and nature of wastewater flows considered can be adequately identified to formulate system or design parameters for the location, sizing, and timing of treatment sites and major transmission systems (interceptors and major trunk lines). Any specific land use and development regulations which affect assumptions made for the above wastewater and land use impact data should be documented. In addition, the origin of the wastewater sources, their location and geographic distribution should be of a comparable level of detail to accurately relate the origin of flows to contributing land uses.

For purposes of displaying land use patterns, a map scale of 1 inch equals 2000 feet would be generally appropriate. This is the scale which the U.S. Geological Survey uses to prepare topographical maps. In undeveloped areas, the scale used in mapping soil associations or soil series may be more appropriate. Parcels of land use can be depicted for units of 20-40 acres in densely developed or developing areas, 40-160 acres for moderately developed land, and 160-640 acres for undeveloped areas. These suggested scales can vary depending on the type of geographic area and wasteloads, and the origin of the wasteloads.

B. Analyze Land Use and Water Quality Relationships

In recent years a number of studies have been completed which have examined the relationships between land use and water quality. Although limited in scope, these studies provide a basis for understanding the impact of land use on water quality. A review of these studies and an understanding of land use-water quality relationships will prove extremely helpful in identifying specific land use controls which may be necessary to successfully implement the plan. Some of these studies are included in the bibliography.

C. Inventory and Projection

An initial step for incorporating land use considerations into the 208 planning process should be a land use inventory and projection. Special emphasis should be given to those geographic areas within the 208 region affecting or affected by water quality. The land use projections must be consistent with the population and employment projections developed in Chapter 3 (3.3.D.6). In addition, population, employment, and land use projections should be consistent with those used in other programs, especially air quality, coastal zone management, and HUD funded land use elements. Primary reliance should be placed on utilizing funds provided under HUD's (701) Comprehensive Planning Assistance Program to complete the inventory and projection.

The inventory and projection should be divided into five-year increments and include industrial, commercial, residential, agricultural, silvicultural, recreational and other land uses from which pollution may be generated. The inventory and projection should be done at the level of detail discussed in the introduction to this section. The projections do not have to be as detailed for the fifteenth and twentieth year of the planning period. This initial projection should be used in the initial development of point and nonpoint source subplans.

In addition to the land uses discussed above, an inventory and/or projection of other factors may be necessary depending on specific conditions and problems in the 208 area. Those factors which are likely to be of importance in most 208 areas are listed below. Before initiating an inventory and/or projection, the specific type of data needed and an appropriate level of detail should be determined:

1. Topographic and soil series classifications;
2. Bodies of water and related lands that would be benefically or adversely affected by a change in water quality;
3. Water supply, treatment, and distribution systems;
4. Existing waste treatment and collection systems, including interim facilities and major urban storm drainage facilities;
5. Solid waste disposal sites;
6. Areas presently served by septic tanks and areas suitable for septic tanks at specified densities;
7. Environmentally sensitive areas:
   - Aquifers and aquifer recharge areas
   - Marshland and wetlands
   - Drainageways and stream buffers
   - Flood plains
   - Forests and woodlands
   - Erodable and/or poorly drained soils
   - Steep slopes
   - Shorelands

D. Display Waste Load Projections

The waste loads projected in Chapter 3 (3.3.D.6.b) should be displayed to show their spatial configuration. The maps used for the display can be of the level of detail discussed previously (1" = 2000'). Rather than using a single map, it would be advisable to use a series of maps so that point sources, nonpoint sources, and different pollutant parameters can be clearly identified.

E. Analyze Alternative Land Use Controls and Practices

Land use controls and practices should be analyzed to determine those which would be most cost efficient in reducing pollutant loadings. The analysis should be done in conjunction with the development of alternative point and nonpoint source subplans to ensure consistency between the proposed controls and the subplans. In addition, the analysis should also be based on the specific water quality problems in the 208 area. For example, if sediment is a primary problem, special consideration should be given to controls such as grading regulations, construction ordinances, and sediment and soil erosion control ordinances.

Land use controls and practices are used to achieve a variety of objectives. In addition, the following should be considered when conducting the analysis:

1. Implementation capability. Careful consideration should be given to the feasibility of land use controls and their relationship to existing and proposed institutional and financial arrangements.

2. Consistency with other programs. To the extent that it is practical, the land use controls should be consistent with other programs, policies, and plans such as those related to transportation, water supply, capital improvements, air quality, etc.

3. Public acceptance. Since controls that are unacceptable to the public are unlikely to be implemented, it is essential that serious consideration be given to the public's viewpoint. Appropriate public participation measures are discussed in Chapter 10.

Land use controls and practices should be reviewed and analyzed as early as possible in the planning process to ensure their feasibility in plan implementation especially with respect to nonpoint source control. When evaluating land use controls and practices for the area, the planning agency must be cognizant of the general authority and requirements for land use provided under state and local environmental, conservation, and land use planning programs. Additionally, the agency should survey existing state enabling laws relating to land use and identify necessary or desirable statutory changes. This will help ensure that the 208 plan can be implemented with proper legal authority. Institutional structures for implementing the controls are fully discussed in Chapter 7.

Following is a list of major land use controls and practices that should be considered as possible measures for implementing pollution control in a 208 area. Other ordinances, regulations, and policies which may have a direct or indirect impact on water quality should also be assessed.

- Zoning
- Flood plain zoning and regulations
- Environmental performance zoning
- Subdivision regulations
- Planned unit development regulations
- Buffer zones
- Conservation and scenic easements
- Density bonuses
- Housing codes
- Building codes
- Construction permits
- Development permits
- Transferable development rights
- Hillside development regulations
- Drainage regulations
- Grading regulations
- Soil erosion and sediment control ordinances
- Solid waste control ordinances
- Septic tank ordinances
- Taxation policies
- Public works policies
- Public investment policies
- Land conservation policies
- Discharge permits

F. Display Waste Loadings for Each Subplan

The waste loadings for each subplan (Chapter 3.3.D.8) should be displayed to show their alternative spatial configuration. A list of the land use controls and practices needed to implement a given subplan should accompany the display. The list as well as the display can be used in the environmental assessment and plan selection process.

G. Final Refinements

After the various subplans have been developed, further refinements should be considered and evaluated according to the criteria for the suitability of the land use controls discussed in Section 3 of this chapter as well as that of cost-effectiveness discussed in Chapter 1. The following questions may prove useful in suggesting some final refinements:

1. Is this the optimum development pattern for water quality?

2. Could the number and magnitude of discharges be reduced if the development pattern was changed?

3. Will the location of discharges have an adverse impact on water quality?

4. Will the timing of discharges have an adverse impact on water quality?

5. Would the implementation of additional land use controls reduce overall investments?

While this final refinement may occur at various places in the planning process, it is preferable to do it at the point where subplans are combined into alternative areawide plans consistent with wasteload reductions (Chapter 3.3.D.10). While the planning agency should exercise discretion if it feels that the final refinement would more appropriately be conducted at some other point in the planning process, it should be noted that the final refinement will be of little value if done prior to the combination of subplans.

H. Outputs

The following information should be provided for each of the combined alternative plans (Chapter 3.3.D.10):

1. A brief narrative description of the proposed land use controls and practices and the water quality problem(s) they will help alleviate;

2. Tables showing population and economic projections for the fifth, tenth, fifteenth, and twentieth year of the planning period disaggregated to the sub-municipal or equivalent level;

3. Working maps displaying the waste loadings for both point and nonpoint sources;

4. Working maps depicting growth, densities, and type of development disaggregated by subareas for the fifth, tenth, fifteenth, and twentieth year of the planning period;

5. A demonstration that the facilities subplans and land use projections are consistent;

6. A demonstration that the existing and proposed land use controls will be consistent with and reinforce the land use projections and the facilities subplans.

CHAPTER 5

DETAILED CONSIDERATIONS FOR POINT SOURCES

5.1 Introduction

Chapter 3 presents a framework for systematic evaluation and selection of pollution control strategies for all sources of pollutants. This chapter describes detailed planning consideration for establishing alternative subplans for controlling point sources of pollution. The point sources considered in this chapter are discharges from municipal treatment plants, combined sewer overflows, separate storm sewer discharges, and industrial waste effluents. Disposal of residual wastes, particularly wastewater sludge, and wastewater reuse are also discussed.

The various point source problems and controls are presented separately in the following sections of this chapter, with combined sewer overflows and storm sewer discharges grouped together because of their intermittent flow characteristics. Balanced consideration of measures other than the traditional capital intensive approaches of point source control is also stressed. Alternatives considered should encompass all applicable structural and management measures for preventing, abating, reducing,storing, treating, separating, recycling, reclaiming and disposing of municipal and industrial wastewater and storm water discharges. The concluding section describes ways of combining the control options for these sources into alternative subplans for point source controls.

5.2 Municipal Wastewater Facilities

A. Introduction

Planning of municipal facilities within an area will provide for (1) cost-effective, environmentally sound, and implementable treatment works to meet the present needs of the area and (2) a general program to phase facilities development to meet future needs as projected in an overall land use plan. Balanced evaluation of nonpoint source abatement and prevention measures as well as point source measures should precede final selection of the treatment works. Treatment works must meet the applicable requirements of Sections 201(g), 301, and 302 of the Act. As a minimum, facilities plans must provide for application, by 1983, of the best practicable waste treatment technology (BPWTT). Where necessary to meet wasteload allocation constraints consistent with water quality standards, plans must provide for measures to further reduce pollutants. The determination of BPWTT, or measures providing for higher treatment levels if needed, is based upon evaluation of technologies included under each of the following waste management techniques:

a. treatment (biological or physical-chemical) and discharge to receiving waters;

b. treatment and reuse;

c. land application or land utilization.

Comparison of the above techniques and determination of BPWTT for a specific case should include considerations for management of nutrients in wastewater and sludges, development of integrated (solid, liquid, and thermal) waste facilities, and enhancement of recreation and open space opportunities.

This section covers major aspects of the municipal wastewater facilities planning presented in the EPA document entitled "Guidance for Facilities Planning"; more detailed information on facilities planning is contained in that document. In 208 planning areas, special attention should be given to the disposal of sludge from the municipal wastewater system. The problem of sludge disposal will likely become more acute in large urban/industrial areas as waste treatment levels increase and development pressures persist.

B. Inventory Existing Conditions and Determine Existing Flows

The existing waste treatment systems must be accurately assessed to establish a basis for planning any systems modifications. Where available, the Section 303 Basin Plans will provide essential information on municipal point sources, waste loads, wastewater flows, and water quality within the planning area. Data from permits would be an additional source of information. At the start of the areawide planning, this data should be reviewed and supplemented as necessary. The assessment of each existing waste treatment system should include a performance evaluation of the treatment plant, including operating problems and personnel, and sampling and maintenance program. Data on current performance of many treatment facilities will be available from State water quality agencies as a result of their programs involving operations and maintenance visits and consultations. An infiltration/inflow analysis should also be made in accordance with EPA Guidance for Sewer System Evaluation to determine whether excessive infiltration or inflow exists and, on a preliminary basis, costs of any corrective measures required. Should the analysis determine the existence of excessive infiltration/inflow, a more detailed sewer system evaluation survey should be made to specifically define problems and determine types and costs of corrective measures. A 208 planning grant cannot be used for the detailed sewer evaluation survey; however, grant assistance may be obtained under a construction grant (40 CFR 35, Subpart E). To assure satisfactory management of residual wastes, an inventory of sludge utilization and disposal should also be conducted.

C. Estimate Future Waste Loads and Flows

To provide a basis for planning and preliminary design of facilities, future variations of waste loads and the flows over the planning period should be forecast. As described in Chapter 4, forecasts should be based upon evaluation of land use plans, economic and demographic growth trends for the planning area, and any growth constraints imposed by air quality implementation plans, zoning restrictions or permit conditions. The effects of selected flow and waste reduction measures, including sewer system rehabilitation to correct infiltration/inflow, should also be reflected in the flow forecasts to permit subsequent calculation of waste treatment system cost reductions.

1. Land Use and Development

Wastewater load and flow projections should conform to the time related development shown on the land use projections that are proposed as being compatible with water quality goals. (See Chapter 4). To avoid changes in the growth pattern from that projected in the land use plan, schedules of hookups consistent with the land use plan should be developed and enforced through a regulatory program. (See Chapter 7).

2. Flow and Waste Load Forecasts

The expected economic and population growth patterns for the planning area, as projected in the land use plan, should be translated into estimates of wastewater flows and waste loads, with a realistic allowance for unpreventable infiltration. The estimated future changes in flows and waste loads from industries served by the municipal system should reflect application of EPA pretreatment requirements for existing and new industries plus any expected process changes affecting wastewater and treatment residuals. Wastewater flow forecasts should also include the effects of applying selected combinations of flow and waste reduction measures within the system and allowance for present and anticipated discharges from septic tank pumpages into the systems.

3. Sludge Generation Forecasts

The volumes and composition of sludge which will be generated from treatment of wastewater should be estimated. These forecasts should be modified to reflect the different treatment levels characteristic of the alternative systems considered.

D. Develop and Evaluate Alternatives

Since 208 planning does not necessarily imply a single interconnected waste treatment system for an area, the development of a facilities system will involve a systematic comparison of many subsystem, as well as system, options. For each municipal wastewater system, subsystem options should be identified. Compatible options should be combined into preliminary treatment systems consistent with the alternative wasteload allocation sets.

By using a rough estimation of cost and impact, the components of the alternative facility plan should then be screened on the basis of goal attainment, monetary costs, and environmental, social, and economic effects. Legal or institutional constraints and implementation feasibility should also be considered. Unacceptable alternatives should be rejected; those remaining should be developed into a limited number of proposals, employing each of the previously discussed waste management techniques. Adequate justification should be given for eliminating any of those techniques at any stage.

The following paragraphs briefly describe major factors to be be considered and procedures to be applied in the development and evaluation of alternative wastewater systems.

1. Flow and Waste Reduction Measures

The Act encourages the use of a variety of methods,where cost-effective,for reducing both the volume and amount of waste within municipal wastewater systems. Some of the following measures would reduce not only wastewater loads, but water supply demands as well:

a. Infiltration/inflow reduction by sewer system rehabilitation and repair,and elimination of roof and foundation drains.

b. Household water conservation measures, such as water saving appliances and fixtures.

c. Water and wastewater rates that impose costs proportional to water used and wastewater generated; use of water meters.

d. Educating the public on the value of water resources and the need to reduce water consumption.

2. Industrial Service

Municipal waste treatment systems should be planned to serve industrial users of the area whenever practicable and cost-effective. Special requirements, issues, and procedures associated with industrial use of a municipal system are covered in section 5.5.B of this chapter.

3. Sewers

a. System Configuration and Capacity

Planning of a waste treatment system includes the comparison of alternative arrangements of interceptors and collection pipes, including phased development, to assure selection of a cost-effective configuration. In newly developing portions of the planning area, the capacities of the system, in particular the larger lateral and interceptor sewers, should generally accomodate not more than the 20-year wastewater projection based upon the land use plan. However, choice of interceptor and collection pipe sizes should reflect cost-effective analysis of alternatives over the planning period. The practice of designing interceptors for long-term projected growth or ultimate development within the service area should be discouraged. As an alternative, consideration should be given to interim (short-term) treatment works for outlying areas or to septic tank units for individual or clustered developments in low density areas.

b. Sewer Hookup Schedules

Since the capacity of the facilities and design of the treatment system is based on flow projections which conform to a time-related land use plan, it is necessary to establish a schedule for hookups in the system. A hookup schedule is important in managing the system over time in order to prevent growth from exceeding the designed capacity of the system.

In the event that a violation of an NPDES permit occurs due to overloading of treatment works,the Regional Administrator(or the state if the NPDES program has been delegated to a state) may, under authority of Sec. 402(h) of the Act, seek a court order imposing a ban or restrictions upon sewer connections. A series of planning and management actions to prevent overloading of facilities may be included as special conditions to permits issued to facilities in danger of imminent overloading.

Since the 208 plan is to include a regulatory program to regulate location of pollutant discharges in the area, and since the management agency(s) must possess authority to refuse to treat wastes from a municipality or subdivision which does not comply with the plan, a schedule of hookups is an appropriate management approach for carrying out this regulatory program. The enforcement of the schedule through the regulatory program may require specific authorizing legislation and will therefore necessitate thorough legal analysis. (See Chapter 7).

4. Waste Management Techniques

Alternative waste management techniques must be evaluated to determine the BPWTT for meeting applicable effluent limitations, including those related to wasteload allocation. Information pertinent to this evaluation is contained in an EPA document entitled "Alternative Waste Management Techniques for Best Practicable Waste Treatment" (Proposed in March 1974). Selection of a waste management technique is closely related to effluent disposal choices. Preliminary alternative systems featuring at least one technique under each of the three categories (treatment and discharge, wastewater reuse, and land application or land utilization) should be identified and screened. A more detailed proposal should be prepared for each, unless adequate justification for eliminating a technique during the screening process is presented.

Published cost, performance, and other information is available for many alternative treatment technologies. Preliminary screening of these technologies involves comparing costs and relative treatment capabilities.

a. Treatment and Discharge

Treatment and discharge techniques include the following:

(1) Biological treatment including ponds, activated sludge, trickling filters, processes for nitrification, and denitrification;

(2) Physical-chemical treatment including chemical flocculation, filtration, activated carbon, breakpoint chlorination, ion exchange, and ammonia stripping.

b. Wastewater Reuse

In comparing waste management techniques and alternative systems, wastewater reuse applications should be evaluated as a means of contributing to local water management goals. Such applications include:

(1) Industrial processes;

(2) Groundwater recharge for water supply enhancement or preventing salt water intrusion;

(3) Surface water supply enhancement;

(4) Recreation lakes;

(5) Land reclamation.

Wastewater reuse needs should be identified and defined by volume, location, and quality. These needs may influence the location of the treatment facilities, the type of process selected, and the degree of treatment required.

c. Land Application

The application of wastewater effluents on the land involves the recycling of most of the organic matter and nutrients by biological action in the soil and plant growth, generally providing a high degree of pollutant removal. Planning of the land application techniques should reflect criteria and other information contained in the EPA document on "Alternative Waste Management Techniques for Best Practicable Waste Treatment".

Land application techniques include:

(1) Spray, ridge and furrow, and flood irrigation techniques;

(2) Overland flow;

(3) Infiltration-percolation;

(4) Other approaches such as evaporation, deep well injection, and subsurface leach fields.

5. Residual (Sludge) Management

Evaluation of alternatives for management of residual wastes should be closely aligned with the evaluation of each waste management technique. Such evaluation includes the evaluation of alternative combinations of sludge processing and utilization techniques for satisfactorily and economically disposing of quantities of residual wastes. Care must be taken to assure that these methods do not appreciably add to air quality or water quality problems.

A variety of sludge processing and utilization techniques are available including (a) thickening, (b) chemical conditioning, (c) chemical stabilization, (d) aerobic and anaerobic digestion, (e) dewatering, (f) thermal processing for volume reduction or drying, (g) composting, and (h) land spreading as a soil conditioner. Sludge disposal options are limited primarily to land disposal, land utilization, and incineration, and must comply with the EPA policy statement on acceptable methods, based on current knowledge, for the ultimate disposal of sludges from publicly-owned wastewater treatment plants.

Disposal techniques such as soil conditioning and land utilization which realize the nutrient value of sludge as fertilizer should be given special attention in adopting a sludge disposal program for the area. Furthermore, consideration should be given to local air pollution control regulations and energy requirements if incineration is an option.

6. Location of Facilities

Evaluation and choice of sites for treatment plants, interceptors, transmission lines, outfalls, pumping plants, and other major works should comply with the land use plan. Factors to be considered in selecting location include:

a. Possible odor and aesthetic problems;

b. Flexibility to convert to possible future reuse and additional pollution abatement needs;

c. Special protection of potable, shellfish, and recreation waters;

d. Avoidance of floodplain and wetland areas, if practicable;

e. Induced growth impacts in flood hazard or environmentally sensitive areas.

7. Regionalization

Regionalization options should be evaluated to assure use of the most cost-effective facilities systems consistent with the areawide waste management needs. Various combinations of treatment plants, interceptors and other works should be identified; and each should be consistent with a target wasteload allocation. The economy of scale associated with a large treatment plant should be balanced with consideration of environmental and social impact, especially if the interconnected system would tend to induce growth patterns conflicting with the land use plan. The effect of streamflow depletion due to transport of wastewater to a downstream plant, and the impact of concentrating wastes from plant effluents at fewer points should also be considered.

8. Phased Development

a. General

In examining the cost-effectiveness of a waste treatment system, two alternatives should be considered: (1) initial provision of sufficient capacity to serve the needs of the area as projected over the planning period; and (2) phased development of systems and modular construction of individual facilities within the system to meet future needs. The phased and modular development option would involve planning for construction of facilities and facilities components at intervals throughout the planning period to accommodate projected increases of waste loads and flows. The following factors should be included in an assessment of the options: the service life of the treatment works; the incremental costs; and flow and waste load forecasts.

b. Reserve and Excess Capacity

The planning of waste treatment facilities will normally provide some excess capacity to allow for daily, wet weather, and seasonal flow variations as well as projected flow increases. The system capacity excess should be examined from a cost-effective viewpoint, particularly for treatment plants serving areas experiencing growth, where phased construction may be more cost-effective than initial construction for long-term capacity needs. Provision of holding storage at the plant intake should also be considered to equalize daily flow variations.

c. Phased Development of System

Phased development of the system is advisable in rapidly growing areas, in areas where the projected flows are uncertain, or where full initial development of facilities would tend to distort growth from that shown in the area land use plan. The phasing should provide sufficient excess capacity at the beginning of each construction phase to accommodate expected flow increases during the phase. Phasing of sewers may involve provision of parallel or multiple systems or extension of single lines.

d. Modular Development of Individual Facilities

Modular development of individual facilities is advisable in areas where high growth rates are projected, where the required degree of treatment must be upgraded later in the planning period, or where existing facilities are to be used initially but phased out later. Modular development would avoid long-term operating problems associated with underutilization of certain components of the plant. Where modular development is used, provisions should be made during the design of the initial facilities for future additions.

e. Interim Facilities

After the 208 plan has been approved, no NPDES permit issued may be in conflict with that plan. Since interim facilities receive permits, they must be considered in the planning process. Such facilities are often used to treat wastes from areas not immediately serviceable by larger, often regional, treatment facilities. Careful consideration should be given to the way in which interim facilities will be used, especially in high growth areas. Since such facilities have the potential for inducing development that may be in conflict with regional service plans, special attention should be given to the interim facilities' eventual connection to the larger system. Thus, in planning for interim facilities, particular consideration should be given to:

1. Ensuring that the area to be served by the interim facility is in conformance with land use plans and controls;

2. Ensuring, through the establishment and enforcement of a schedule of hookups for the life of the facility, that the interim facility will not be overloaded;

3. Ensuring when the facility is no longer needed, that its service area is transferred to a permanent facility;

4. Reusing the abandoned facility for some other needed function, such as use as a pumping station;

5. Ensuring proper operation, maintenance, and inspection. (Trained, certified operators should be used.)

f. Flexibility and Reliability

Flexibility and reliability should be considered throughout the planning of municipal facilities. As mentioned in previous sections, flexibility factors include possible upgrading of water quality objectives, future application of new technologies, future application of wastewater reuse, modular and phased development of facilities, and temporary treatment plants.

Reliability considerations are important, since a risk of failure exists in any wastewater system. With a view toward minimizing this risk, the probability, duration, and impact of such failures should be considered for each system and its components.

5.3 Other Point Sources

The identification of other point sources within the planning area, possible control options, and feasible controls should be included in point source subplans. In particular, private wastewater systems should be evaluated, preferably in conjunction with the municipal wastewater facilities. Information regarding planned capacity of such systems should be sought from private waste water management agencies. Planned capacity should be reviewed for consistency with future waste load reductions. Any point sources required to obtain permits should be included in point source subplans.

5.4 Combined and Storm Sewer Discharges

A. Introduction

Storm sewer discharges and combined sewer overflows can be sources of significant quantities of pollutants. Since they are an integral part of the municipal wastewater collection system, untreated overflows from combined sewers pose an added threat to public health.

Various techniques for controlling and treating combined and stormwater flows can be incorporated into alternative areawide subplans for point sources. Quite often, these problems can be substantially reduced through effective control of the sources and/or the runoff before it enters the storm and combined sewer systems, as is discussed in Chapter 6. The most cost-effective combination of controlling the problems at their source or controlling the runoff once it enters the stormwater system can be made in the later steps of the planning process where alternative subplans for point and nonpoint sources are combined into alternative areawide plans. (Chapter 3.3 D.10).

B. Inventory Existing Conditions

An inventory of existing storm and combined sewer systems should be conducted to the extent data is available; the inventory should include locations and condition of intake bypasses, pipes, regulatory equipment and other features, and an assessment of both the existing performance of the system and its optimum performance with intensive management, operation and maintenance. Information on flow variations, design capacities, wastewater constituents, and waste loads is also needed. Where flow records are lacking, estimates of overflows and discharges based upon observations should be correlated with rainfall amounts. Wasteload estimates should be based on pollutant sampling and subsequent tests for dissolved oxygen (DO), biochemical oxygen demand (BOD), ammonia nitrogen (NH_3-N), phosphates (P_2O_5), total solids (TS), suspended solids (SS), toxics, and both total and fecal coliform counts.

C. Estimate Future Waste Loads and Flows

To provide a basis for planning of control measures, forecasts should be made of the waste load magnitude, intensity, and duration of the problems associated with discharges throughout the planning period. Information on existing discharges can provide a convenient base for the estimates. Flow volumes and waste loads during storm periods should be related to the tributary drainage area; the resulting information can permit forecasting of flow volumes and wasteload increases resulting from future changes in land use and development. This information can provide the basis for estimating flows in storm sewer systems within the planning area. Adjustments in projections should be made to account for density changes, reduction in pollutant discharges due to future protection of environmentally sensitive areas as reflected in the land use plan, and probable flow and waste reduction measures.

D. Develop and Evaluate Alternatives

The development of alternative areawide control of combined sewer overflows and storm sewer runoff involves the systematic comparison of feasible control options, both structural and nonstructural. Operational strategies should be explored for the entire system to maximize use of the system capacity. EPA research has demonstrated many types of control and treatment techniques for combined sewer overflows. Among these, storage options both upstream from the system or within the systems appear feasible. However, this capacity would generally be limited to the most highly polluted initial storm runoff from a low-frequency storm event (one chance in one, to one chance in five of being equalled or exceeded during any single year).

Specific factors to be considered in the development and evaluation of combined and storm sewer discharge subplan components are contained in the following paragraphs. In general, the most cost-effective solution will be a mixture of operation/maintenance and construction techniques.

1. Flow and Waste Reduction

A variety of techniques can be used for reducing flow volumes and waste amounts from entering the system. Consideration of these techniques should be coordinated with nonpoint source control options planned for the tributary drainage area. They include:

a. Reduce disturbance of land cover and maintain surface infiltration capacities;

b. Control patterns and densities of urban development;

c. Reduce nonpoint source runoff through control measures for urban and construction activities;

d. Preserve or manage lands that have natural or existing characteristics for retarding or reducing flow and surface pollutants;

e. Control surface runoff and in-system runoff by use of permeable material for paving, flow retardation structures, and other means of storing and retarding runoff, including planned intermittent shallow flooding of parking areas, streets and other surfaces where damage would be minimal.

In 208 planning, emphasis should be placed on use of the above techniques as alternatives or supplements to the control measures discussed below, as the former are generally far more cost-effective and less environmentally disruptive.

2. Alternative Control Techniques

Alternative control techniques that should be considered in combined sewer overflow and storm sewer discharges can be grouped into the following five categories. Although these categories apply primarily to combined sewer overflows, some of them could be appropriate for storm sewer discharges.

a. Separation of sewage and storm collection systems (generally the most costly and least environmentally acceptable approach);

b. Operational control of the existing system (maximum use of the system storage by computerized flow regulation and subsequent treatment at the plant);

c. Storage at points within the system or at the point of discharge, and subsequent treatment;

d. Direct treatment of overflows (in-line high rate treatment methods);

e. High level of maintenance including periodic flushing of sewer systems.

3. Location of Sewer Outlets

Storm sewer capacities are generally related to the potential damage and public inconvenience associated with rainfall. These sewers usually have outlets into nearby waterways that can adequately receive the projected runoff. Storm sewer systems should be evaluated together with the existing systems.

The cumulative net increase in runoff attributed to these systems should be evaluated to determine the associated effects on flood stages in the receiving waters. More important, from a water quality viewpoint, the existing waste loads and anticipated future storm sewer discharges should be evaluated and compared with the wasteload reduction limits. Where these limits would be exceeded, an extension or relocation of the outlet sewers to locations where the receiving streams can readily assimilate the wastes may be more cost-effective than developing control measures.

5.5 Industrial Wastewater

A. Introduction

The overall objective of planning for the control and treatment of industrial wastewater is to provide the most efficient approach for serving the present and future industrial wastewater treatment needs of the area. Treatment techniques must meet the applicable requirements of Section 204, 301, 302, 304, 306, 307, and 316 of the Act. Industries served by municipal systems must comply with pretreatment and cost recovery requirements. Direct discharge of industrial wastes to receiving waters must comply, at a minimum, with the provisions of the pertinent Effluent Limitations Guidelines and New Sources Performance Standards. Higher treatment levels or internal wasteload reductions will be required where wasteload allocations dictate more stringent restrictions. Application of higher treatment levels to meet water quality standards can be mitigated through restricting the location of future industrial development to areas where receiving waters can more readily assimilate the treated wastewater. Control of industrial location should be incorporated into the land use plan with recognition of other constraints such as air quality control.

The procedures for evaluating industrial waste sources and problems are basically parallel to those presented in section 5.2 of this chapter for municipal wastewater systems.

Wastewater flows from all major industrial sources in the area should be accurately assessed. Existing information should be used where available, including information on those industries that discharge into municipal systems. To estimate design flows and wasteload reductions, information is needed on average flowrates, flow variations, seasonal variations, wastewater characteristics and constituents, and mode of disposal. Particular emphasis should be given to toxic constituents within the wastes and to thermal pollutants present. Forecasts should be made of the future variations of waste loads and flows over the planning period and the discharge locations of those wastes. These forecasts should be based upon economic and industrial trends, types of industries and constituents of associated wastes, location constraints imposed by the land use plan, and other restrictions imposed by industrial permits and air quality implementation plans. Attention should be given to estimating waste sludges and slurries generated by the industries as well as to the influence that industrial loads will have on treatment plant sludge. The effects of user charges, pretreatment, and effluent limitations guidelines or higher treatment levels on water and wastewater flows should be incorporated into the projections.

B. Develop and Evaluate Alternatives

The development of alternative approaches for treatment of industrial wastes and the degree of treatment, involves a systematic comparison of the following options:

a. Pretreatment and discharge of wastewater to municipal systems;

b. Direct treatment by individual industries and discharge of wastewater into receiving waters;

c. Direct treatment and discharge by groups of industries;

d. Reuse of industrial wastewater;

e. Land application.

In conjunction with each of the above options, consideration should be given to discharge to either water or land and to the effects of flow and waste reduction on internal recycling and process changes. Areawide options should be identified in terms of meeting wasteload allocation constraints and compared to provide a rough assessment of costs and impact. Consideration should also be given to institutional constraints and feasibility.

Specific issues that should be addressed in formulating alternatives are included in the following paragraphs:

1. Flow and Waste Reduction

The flow and waste reduction as it relates to those industries that discharge or will discharge into municipal systems should be assessed. Increasingly stringent technical and financial requirements on industry should lead to process changes that use less water and create less wastewater.

2. Minimum Effluent Limitations

Industrial wastewater treatment must comply with the minimum treatment requirements for Best Practicable Control Technology (BPT) and Best Available Control Technology (BAT) by 1977 and 1983, respectively. These treatment requirements are set forth for the industries cited in Section 306 of the Act in a series of EPA documents entitled "Development Document for Effluent Limitations Guidelines and New Source Performance Standards for ______Point Source Industry". These guidelines contain criteria for each industry for Best Practicable Control Technology Currently Available (known commonly as BPT) and Best Available Control Technology Economically Attainable (known as BAT). The guidelines also provide minimum criteria for New Source Performance Standards and New Source Pretreatment Standards.

3. Joint vs. Separate Municipal and Industrial Facilities

Municipal waste treatment systems should be planned to serve industrial users of the area whenever practicable and cost-effective. Because of the unusual economy of scale associated with larger municipal-industrial facilities, as compared to separate municipal and industrial facilities, a joint system will often be cost-effective. In many cases, however, it may be more economical to have separate industrial treatment facilities because of the characteristics and quantities of industrial waste, industrial pretreatment requirements, and industrial locations and groupings which facilitate joint industrial treatment and/or reuse of industrial wastewater. These considerations are also relevant to the cost and effectiveness of sludge disposal options for each alternative facility.

Industrial use of municipal facilities should be encouraged where total costs would be minimized. Where industrial flow handled by municipal systems is significant, cost of separate treatment of industrial wastes versus cost of pretreatment and joint municipal-industrial facilities should be compared. This involves comparing the incremental cost of the municipal facilities required to transport, treat, and dispose industrial wastes (and the costs of corresponding pretreatment required) with the cost of separate industrial treatment and disposal facilities of those wastes. In particular, the analysis should cover those industries desiring, but not receiving, municipal service when facilities planning is initiated.

4. Pretreatment and Cost Recovery

Industrial wastes served by municipal systems must comply with industrial pretreatment and cost recovery regulations. The pretreatment regulations basically require the removal of industrial waste constituents that are not compatible with the municipal wastewater treatment process. Compatible wastes, generally BOD and suspended solids, can be passed to the municipal plant for treatment. The cost recovery regulations prescribe that industrial users must bear a proportionate share of the cost of operating and maintaining the municipal system and must repay of the portion of the federal grant attributed to that waste. Industrial sites should be located where receiving waters can more readily assimilate the residual wastes and associated nonpoint source runoff. Such control of industrial locations should be incorporated into the land use plan and recognize other constraints such as air quality control.

5.6 Development of Alternative Subplans

The alternative subplans for point source controls should correspond to alternative wasteload allocation sets for design conditions for meeting water quality standards under both dry weather and rainfall conditions. At least one subplan should be developed to correspond to each wasteload allocation set. Subplans for continuous point sources, primarily from municipal and industrial treatment works, should satisfy the wasteload allocation sets for dry weather conditions. Subplans for combined and storm sewer flows should correspond to wasteload reductions for design conditions reflecting rainfall.

A. Continuous and Seasonal Point Source Subplans

Investigation of controls for municipal and industrial wastewater may reveal control options that do not correspond to the target wasteload reduction sets previously considered. Additional wasteload reduction sets should be developed if necessary to enable consideration of reasonable point source control techniques.

B. Intermittent Point Source Subplans

Subplans for intermittent point sources such as combined and storm sewer discharges should correspond to target wasteload reduction sets prepared to enable meeting standards under wet weather conditions. As discussed in Chapter 3, calculation of treatment levels required to meet standards at wet weather conditions should be based on point source treatment levels established for dry weather conditions. Thus, the additional wasteloads carried to streams after rain should be dealt with through load reduction for intermittent point sources and nonpoint sources.

C. Disposal of Residual Wastes

Point source subplans should provide for the disposal of residual wastes and should conform with an areawide program of solid waste disposal.

D. Description of Alternative Subplans

Following the screening of the system alternatives, the following information on the alternative subplans should be presented as an input to the systematic comparison of areawide pollution control alternatives (refer to Chapter 3.3.D.8).

- Wasteload characteristics of each alternative expressed in appropriate units for relating to the water quality prediction model;
- Total cost of each alternative expressed as its present value or average equivalent value of capital and operating costs for the overall alternative and subsystem components;
- Reliability of each alternative and subsystem included in each alternative;
- Significant environmental effects of each alternative consistent with NEPA procedures, including a specific statement on future development impact;
- Contribution of each alternative to other water-related objectives of the planning area.

CHAPTER 6

DETAILED CONSIDERATIONS FOR NONPOINT SOURCE MANAGEMENT

6.1 Introduction

Chapter 3 presents a framework for the systematic evaluation of all sources of pollution and selection of alternative plans for the area. The control plans must identify nonpoint sources, evaluate their impact on water quality, and delineate measures for their control.

Nonpoint sources, while not defined in the Act, are, by inference, the accumulated pollutants in the stream, diffuse runoff, seepage, and percolation contributing to the degradation of the quality of surface and ground waters. They include the natural sources (seeps, springs, etc.) and millions of small point sources that presently are not covered by effluent permits under the National Pollution Discharge Elimination System.

Provisions for control of nonpoint sources from agricultural, silvicultural, mining, construction and urban/suburban areas must be included in the development of a control plan. Land and subsurface disposal of residual wastes, salt water intrusion, and hydrographic modification contributing to water quality degradation must also be considered.

6.2 Statutory Requirements and EPA Policy

A. Statute

Sec. 208(b)(2)(C)(i) states that a 208 plan shall include establishment of a regulatory program to "implement the waste treatment management requirements of Sec. 201(c)," which calls for control of all point and nonpoint sources of pollution.

Section 208(b)(2)(F-I) states that a plan prepared under the areawide waste treatment management planning process shall include:

> "A process to (i) identify, if appropriate, ...[nonpoint sources of pollution]..and (ii) set forth procedures and methods (including land use requirements) to control to the extent feasible such sources."

Finally, Sections 208(b)(2)(J) and (K) provide that a plan shall include:

> "A process to control the disposition of all residual waste generated in such area which could affect water quality," and
>
> "a process to control disposal of pollutants on land or in subsurface excavations within such area to protect ground and surface water quality;"

B. EPA Policy on Implementing the Statutory Requirements

The requirement for a regulatory program over all point and nonpoint sources places a clear responsibility on areas developing 208 plans to establish regulation of nonpoint sources. It is EPA policy that the type of regulation appropriate for each nonpoint source category should be established at the state or areawide level in the case of designated 208 areas.

For each nonpoint source problem category, "Best Management Practices" (BMP) should be defined and implemented through appropriate regulation. The term "Best Management Practice" refers to a practice or combination of practices that is determined by a state after examination of alternative practices to be practicable and most effective in preventing or reducing the amount of pollution generated by a nonpoint source to a level compatible with water quality goals. The "best" practice for reducing nonpoint sources in a given area will depend on the particular physical characteristics of the watershed (soil, slope, rainfall, etc.) as well as the nature of man's activities that cause nonpoint source pollution generation (prevailing forms of construction activity, mining, agriculture, etc.)

While it is not practical to try to establish precise cause and effect relationships between each nonpoint source generating activity and water quality, the degree of control of nonpoint sources should be based on the degree of water quality protection needed in an area. Generalized assessments of cost and effectiveness of control alternatives to meet overall targets of nonpoint source pollution reduction should be the basis for determining the "best" management practice for nonpoint sources in the area. The level of detail of nonpoint source planning should be influenced by the availability of information upon which to base the choice of best management practices.

Finally, definition of best management practices may distinguish between existing nonpoint source problems and potential problems. Management of existing problems may require fairly detailed assessment of the exact nature of existing problems and appropriate management techniques. For example, establishing better management of existing urban runoff problems may entail investigating street cleaning operations, sanitation services, catchment basin design, and stormwater systems. (These systems are treated as a point source problem in this guideline--see Chapter 5).

Before choosing best management practices for existing urban runoff pollution, the cost and effectiveness of the various options under existing local conditions should be assessed. On the other hand, more generalized assessment could be made of techniques to prevent future urban runoff problems. The assessment would be based on cost and effectiveness of controls under average conditions. The degree of control over new nonpoint sources should be such as to prevent deterioration of water quality due to introduction of new sources. Thus management practices capable of very high levels of abatement for new nonpoint sources may be the appropriate "best management practices." For example in the case of urban runoff, performance criteria for construction of new stormwater systems might be established such that the natural rates of runoff in the area would be maintained through stormwater system designs that would attenuate runoff.

C. State Involvement in Establishing Nonpoint Source Regulatory Programs

EPA is considering how the states can implement a nonpoint source regulatory program as required by Sec. 208(b)(2)(C)(i) in nondesignated areas, or in designated areas, where, pursuant to Sec. 208(b)(4), the governor certifies that consistency with a statewide regulatory program so requires. Because of the difficulty of undertaking case-by-case cost-effectiveness analysis for particular nonpoint source problems, it is envisioned that states would establish a definition of Best Management Practices for various nonpoint source categories. EPA would provide guidance to the states on how to establish nonpoint regulatory programs, but the definition of control requirements would be determined at the state level, reflecting local conditions and means of enforcement. Definition of Best Management Practices would establish minimum levels for nonpoint source control. Cost-effectiveness analysis would be appropriate to determine the need for higher levels of nonpoint source pollution abatement, particularly in cases where large investments might be necessary to remedy a given problem.

6.3 Development of a Nonpoint Source Planning Approach in Designated Areas

A. Objectives of Nonpoint Source Planning

Full delineation of the water quality problems of an area requires consideration of both point and nonpoint sources of water pollution. The objective is to evaluate both sources of pollution and to integrate a control program for significant nonpoint sources into an overall water quality protection plan. Nonpoint source controls may be necessary for several reasons:

1. Attainment and maintenance of water quality objectives may be impossible using only the point source controls;
2. Inequity may result from imposition of point source controls only;
3. Nonpoint source controls may be the most cost-effective.

B. Problem Identification

Using available data, a preliminary assessment of the magnitude of the nonpoint source problem should be undertaken. A determination should be made of the categories of nonpoint source pollution in the area that significantly impair meeting and maintaining water quality standards. Potential problems as well as existing problems should be assessed.

C. Priorities for Planning

In establishing planning priorities for the technical planning process (see Chapter 3), it is important to consider the priorities that the states may establish for nonpoint source control. By coordination between areawide and statewide nonpoint source planning, more effective and comprehensive programs for nonpoint source control can be established.

As explained in Chapter 3, priorities for planning should place greatest attention on problems that can be solved with existing technology and sources of funding.

D. Distinguish Planning Approach for Existing and New Nonpoint Sources

For each category of nonpoint sources in the area, an operational definition of new and existing sources should be established. For example, all new stormwater systems and hydrographic modification after a given date might be considered as "new". Normal changes in the conduct of a given activity such as agriculture should not be considered as creating a new source. Rather the distinction should be based on major changes in topography and drainage that would tend to cause significant increases in nonpoint source pollution. The purpose of the distinction between new and existing sources is twofold. First, greater depth of planning detail may be appropriate in determining management practices for existing sources, which vary greatly in their magnitude and controlability. Secondly, since it is not possible to anticipate the magnitude of future nonpoint source problems, the presumption should be that once existing sources adopt controls needed to protect water quality, new sources should be required to adopt the best practices available for preventing future increases in pollution. The best practices for new sources will in many cases prevent more pollution per dollar spent than best practices for existing sources, since there will be flexibility to prevent problems before they arise, rather than attempt to control them after the fact.

6.4 Identification and Evaluation of Existing Nonpoint Sources

A. Estimates of Nonpoint Source Loading

The first step toward establishing a definition of the best management practices for nonpoint sources is an estimate of the existing nonpoint source problem. This requires establishing the extent of the problem in the receiving waters and then determining the origin of the sources contributing to the problems in the stream.

1. Identification of Nonpoint Source Problem in the Receiving Waters

The nonpoint sources are the sources contributing to water quality degradation where that degradation cannot be accounted for by the known point sources. This applies from the largest basin to the smallest subbasin. It can be expressed as follows:

$$N = (Q+S+D) - (P+I)$$

where:

N = Quantity (mass) of nonpoint source pollutants in terms of a given parameter, under a given design flow condition

Q = Quantity of pollutants in the water leaving the test area

S = Quantity of settlement and precipitation of pollutant

D = Quantity of decay of nonconservative pollutants

P = Quantity of pollutants discharged by point sources (assumed to be constant under a given design flow condition)

I = Quantity of pollutants in the water entering the test area

2. Identification of the Origins of Nonpoint Sources

Once the total nonpoint source load of a given pollutant under given flow conditions has been established, it is necessary to evaluate the breakdown of sources of this pollutant load.

The runoff, seepage, and percolation of pollutants from nonpoint sources is highly dependent on climatic, seasonal, and other variable events. High rainfall, antecedent rainfalls, cropping patterns, street sweeping schedules, time of travel of runoff, scouring and re-entry of pollutants, etc., must be considered in the evaluation. While average conditions shed light on the general situation, an analysis based on high and/or low runoff periods, covering specific climatic events and seasonal periods, is more likely to provide an accurate evaluation of the significance of each nonpoint source.

Data from sources such as building inspection offices, soil and water conservation districts, and planning agencies, should be evaluated to locate many of the potential nonpoint sources of pollutants. Soil survey maps, construction records, urban sanitation records, and other such documents can provide much information for evaluating of the pollution potential from nonpoint sources. A number of agencies (USGS, water treatment plants, health units, etc.) maintain water quality records, which should provide insight on the origin of nonpoint sources.

In general, there are two approaches for tracing the origin of nonpoint source loadings:

(1) generalized prediction and,

(2) monitoring and sampling.

Whichever approach or combination of approaches is used, the objective should be to determine a materials balance for nonpoint sources showing loading for each pollutant to the streams and origin of the loads. This information can be usefully displayed on the land use maps that are prepared in conjunction with point and nonpoint source planning (see Chapter 4). The materials balance can be broken down to whatever degree of detail is appropriate, depending on the accuracy of the method for estimating nonpoint source loading. In general, sampling and monitoring may be needed where problems are so site-specific that prediction techniques cannot be used with confidence; otherwise prediction techniques may be preferable, especially those that can be applied using existing information. However, analysis of nonpoint source loading should only be carried out to the level of detail needed to choose best management practices.

a. Prediction of Nonpoint Source Loads

Because monitoring and sampling for nonpoint source detection is costly and requires a long time period to construct an accurate set of data, it is advantageous to use nonpoint source load prediction techniques.

These techniques enable prediction of nonpoint source load generation and transport based on such measurable watershed parameters as soil, slope, vegetative cover, land use, size of drainage area, etc. While these techniques vary in their reliability, especially with regard to soluble pollutants and pollutants subject to breakdown in the environment, they are generally adequate for enabling choice of best management practices.

Guidance on the applicability of these models and the services available from federal agencies for utilizing the models is discussed in:

U.S. Environmental Protection Agency. Methods for Identifying and Evaluating the Nature and Extent of Nonpoint Sources of Pollution, Report No. EPA 430/9-73-014. Washington, D.C. 1973. GPO, $2.45.

Additional guidance on prediction models and techniques for nonpoint sources is being developed by EPA and will be available in subsequent guidance.

b. Monitoring and Sampling to Identify Nonpoint Sources

Monitoring and sampling should be undertaken in the short term to identify nonpoint source loading in situations where more accurate estimates are needed than can be obtained through use of predictive models. Secondly, monitoring and sampling should be undertaken over a longer term to refine information on nonpoint source loading and to serve as a management device for assessing the progress made in attaining and maintaining water quality through implementation of best management practices.

In the short term, monitoring may be undertaken, if necessary, to estimate a single gross allotment (target abatement level) for all nonpoint sources contributing to a given water quality segment. Also, monitoring of carefully selected nonpoint sources may be undertaken as necessary to calibrate/verify the analytical technique chosen to estimate the nature and relative magnitude of the loads associated with each nonpoint source category. In particular, monitoring may be needed to verify or supplement loading estimates for such sources as stormwater outfalls, waste lagoons, septic seepage areas, land fills, spray irrigation areas, and other significant sources that are difficult to estimate through predictive techniques.

Since it is not expected that nonpoint source load estimates can be verified in the relatively short timeframe of initial 208 plan formulation, it may be desirable to initiate an ongoing monitoring program to be carried out in the plan implementation phase.

The monitoring and sampling approach needed for nonpoint source identification and verification should determine a schedule of prioritized activities that will enable a given degree of identification of individual nonpoint sources at a given point. For example, if the total nonpoint source load to the area is 1/3 of the total pollutant load for a given pollutant, the monitoring and sampling activities should be aimed at verifying a given percent of the nonpoint source load by a given date. Instream water quality data which could be related to specific nonpoint source sites should be evaluated in order to determine whether a given increment of waste detectable in the stream could be attributed to a given nonpoint source. The sum of the wasteloads that could be traced back to contributing sources should be a given percent of the total nonpoint source load that is chosen for the initial monitoring and sampling coverage. If the individual nonpoint sources that can be identified do not sum up to that given percent of the total nonpoint source load, then additional data should be collected.

6.5 Assessment of Nonpoint Source Management Practices

No single control method or set of control methods will be appropriate for all types of nonpoint source problems. Even controls for a particular type of source will vary in effectiveness according to geographic location. The controls should be tailored to local conditions if they are to be effective. Thus, a thorough knowledge of both specific types of nonpoint sources and local conditions is a prerequisite to the design of appropriate and effective controls.

The second step in determining best management practices for nonpoint sources is the identification of the technically feasible structural controls and the practicable nonstructural controls that are available for particular nonpoint source problems. Technically feasible control alternatives for particular types of nonpoint sources likely to be encountered in urban-industrial areas are described in this section. It should be emphasized that these control alternatives are cited only as examples, and that other viable alternatives, if available, should also be investigated and considered.

In depth information on the various control alternatives may be obtained from the referenced guidance reports for each type of source. In general, controls for nonpoint sources consist of either structural controls or land use and land management controls. The implementation and enforcement of these nonpoint source controls is further discussed in Chapter 7.

A. Urban Stormwater Runoff

Water pollution from urban runoff is related to both the quantity and quality of the stormwater runoff. Rainfall dislodges pollutants from street surfaces, roof tops, lawns and other urban sources, causing contaminant particles to become suspended in solution. Subsequent runoff transports the pollutants across urban land, into gutters, and eventually deposits the runoff into receiving waters. The pollutant concentration is therefore greatest at the beginning of a rainfall event and diminishes as rainfall continues.

Almost every conceivable pollutant has been identified in urban runoff. The most common pollutants include: dust, dirt, pathogens, fertilizers, pesticides, battery acid, rubber, grease, oil, animal and bird droppings, heavy metals, salts, sand, gravel, coal, leaves, paper products, plastics, glasswares, and metals.

The pollutant load in a particular storm runoff depends upon (1) the amount of material which has accumulated or developed on surfaces since the last storm and (2) the volume and velocity of stormwater. A direct relationship exists between the cleanliness of the urban environment and the pollutants in storm water runoff.

Measures for controlling the pollution potential from urban storm runoff include:

1. Public cooperation in reducing amounts of street litter, adoption and enforcement of anti-dumping and anti-littering ordinances, and public education programs, e.g. "Clean Cities Campaign";

2. Installation of adequate waste receptacles on public streets, street sweeping and other programs for reducing the accumulation of pollutants on urban streets, roof drainage controls, and use of catch basins to retain the first flush of polluted storm water runoff;

3. Reduction in the indiscriminate use of fertilizers and pest control chemicals;

4. Land drainage modifications for reducing or eliminating the runoff of polluted waste waters, and measures to minimize the impact of runoff water containing snow and ice control chemicals.

5. Better management of existing storm drainage systems; storage and treatment of runoff waters. (These and other approaches for dealing with urban runoff once it enters the storm drainage system are discussed in Chapter 5.4).

More detailed guidance can be obtained from:

U. S. Environmental Protection Agency, Urban Stormwater Management and Technology: An Assessment, Report no. 670/2-74-040, National Environmental Research Center, Cincinnati, 1974. GPO, NTIS (awaiting number assignment)

Office of Water Resources Research. Practice in Detention of Stormwater Runoff Herbert G. Poertner, American Public Works Association, 1974. NTIS PB-234-554.

U. S. Department of Interior, Office of Water Resources. Water Resources Protection Measures in Land Development: A Handbook. Washington, D.C. 1974. NTIS PB-236-049.

B. Construction Activities

Construction activities are major earth-disturbing operations required for the development of highways, dams, aqueducts, housing tracts, shopping centers, and other facilities. They include stripping of topsoils, grading of slopes, fertilization and vegetation of exposed soils, pest control, and site restoration following construction.

Construction related pollution results from erosion of bare soils, careless spillage of materials, increased storm water runoff, excessive use of fertilizers, pesticides, or other materials, and other generally poor "housekeeping" practices which permit pollutants to be transported from the site area by runoff waters.

Pollutants resulting from construction activity consist primarily of sediment, both mineral and organic, which transport other pollutants such as chemicals used to fertilize and condition soils, pesticides, petroleum products, and pathogenic biological organisms.

Effective control of nonpoint sources of pollution should be done on a site-by-site basis, and initiated during the preliminary stages of a project. These measures should be considered during site planning and design. Adequate control must include proper maintenance of the measures installed. Nonpoint source control programs might include:

1. Installing structural and vegetative measures which will protect environmentally sensitive areas of the site;

2. Controlling the velocity and volume of runoff water to prevent erosion and transport of sediments and other pollutants;

3. Diverting runoff and trapping sediment;

4. Requiring that nonpoint source control be considered in construction contracts as well as procedures for the maintenance and inspection of measures installed;

5. Using stage grading, seeding, and sodding procedures.

More detailed guidance can be obtained from:

U. S. Environmental Protection Agency. *Comparative Costs of Erosion and Sediment Control, Construction Activities*, Report no. EPA 430/9-73-016. Washington, D.C. 1973. GPO $2.20

U. S. Environmental Protection Agency. *Processes, Procedures, and Methods to Control Pollution Resulting from all Construction Activity*, Report no. EPA 430/9-73-007. Washington, D.C. 1973 GPO $2.30

C. Hydrographic Modifications

The various modifications that may be made within a body of water to its banks, or in its drainage area, represent a potential source of nonpoint pollution.

Hydrographic modifications such as channelization and urbanization can increase volume and velocity of runoff causing channel erosion in streams, resulting in sediment pollution. Dredging and dredge spoil disposal can introduce sediment, chemical, and biological pollutants into waters. Water impoundments can cause concentration and detention of pollutants of all types. Controls are listed below for various categories of hydrographic modification:

1. Channelization

a. Use of impoundments to control flow rather than enlarging channel capacity

b. Use of natural contour in design rather than creation of new stream alignment

c. Use of proper materials and design in channel construction

d. Legal/institutional controls to prevent construction and thus avoid flood damage in flood plains

e. Structural alternatives - levees, floodways, retarding basins.

2. Water Impoundments

a. Pre-impoundment design and site preparation to mitigate future eutrophication problems

b. Prevention of poor quality water due to stratification

(1) multi-level outlets
(2) aeration of releases
(3) reservoir mixing

c. Eutrophication

(1) Reduce nutrient inflow to control plankton and epilimnetic forms

(2) Vary water levels to control rooted forms

3. Urbanization

a. Regulation of land use to control:

(1) sources and type of pollutants

(2) amount and location of impervious surfaces (especially important in aquifer recharge areas)

b. Waste management and environmental sanitation -- prevention of waste introduction in surface and ground waters

c. Public education for waste control

4. Dredging and Dredge Spoil Disposal

a. Spoil treatment during dredging operation -- chemical treatment (to aid in dewatering) and disposal techniques (floculation, incineration, filtration, etc.)

b. Productive uses of spoil:

(1) creation of wildlife habitat areas

(2) agricultural land use

(3) land reclamation

More detailed guidance can be obtained from:

U. S. Environmental Protection Agency. The Control of Pollution from Hydrographic Modifications, Report no. EPA 430/9-73-017. Washington, D.C. 1973. GPO, $1.95

D. Land and Subsurface Disposals of Residual Waste

Disposal of residual wastes on the land and in subsurface sites may result in ground and surface water pollution through gradual flow of liquid pollutants or leaching of solid pollutants from disposal sites. Some of the types of sources and possible control methods for land and subsurface disposal of residual wastes are the following:

1. Land and Subsurface Disposal of Liquid Waste

   a. Pollution from wells, waste, brine, radioactive gas storage

      (1) site evaluation

      (2) waste amenability evaluation

      (3) construction

      (4) requisite equipment and emergency procedures

      (5) monitoring well and aquifer response

   b. Pollution from other subsurface excavations

      (1) siting and design of lagoons, basins and pits to avoid bypassing natural protective mechanisms

      (2) pretreatment, lining, barrier wells, and outright use bans

   c. Septic tank-percolation field systems

      (1) abandonment in favor of sewerage systems

      (2) require approval of installation site and installation by competent professionals

      (3) use of proper operating procedures and maintenance for such systems

   d. Sewer leakage

      (1) modernization of sewer construction

      (2) codes and specifications as a state rather than local responsibility

      (3) internal and external inspection and repair program at five year intervals

      (4) exclusion of the discharge of materials damaging to sewers and/or ground water

   e. Tank and pipeline leakage

      (1) use of corrosion-preventing coatings, cathodic protection or internal linings to prevent corrosion-caused leaks

(2) design of storage sites to contain leaked liquids before soil adsorption

(3) automatic shut-off valves

(4) recovering by pumping techniques

(5) inspections and pressure testing

More detailed guidance can be obtained from:

U. S. Environmental Protection Agency. Subsurface Water Pollution, A Selected Annotated Bibliography. Part I - "Subsurface Waste Injection"; Part II - "Saline Water Intrusion"; Part III -"Percolation from Subsurface Sources". Washington, D.C. NTIS, Part I: PB-211-340; Part II; PB-211-341; Part III: PB-211-342.

U.S. Environmental Protection Agency. Ground Water Pollution from Subsurface Excavations,Report no. EPA 430/9-73-012. Washington, D.C. 1973. GPO. $2.25

2. Land and Subsurface Disposal of Solid Wastes

a. Existing Sites

(1) compaction of deposited wastes and covering with at least two feet of compacted soil; slopes to promote runoff, thereby minimizing infiltration

(2) conversion to a sanitary landfill

(3) diversion of surface runoff or streams around the fill area

(4) establishment of vegetative cover

(5) diversion of groundwater

(6) extraction and treatment of polluted water

b. New Sites

(1) diversion of surface runoff or streams around the fill area

(2) operation as a sanitary landfill, including daily application of six-inch (minimum) layers of compact cover soil and application of two-foot (minimum) layers of compacted soil as final cover

(3) sloping and vegetation of surfaces to promote runoff, rather than infiltration

(4) construction of an impervious barrier in the bottom of the fill area

(5) collection and treatment of polluted water

(6) judicious consideration of hydrogeological conditions in site selection

More detailed guidance can be obtained from:

U. S. Environmental Protection Agency. Sanitary Land Fill Design and Operation. Dick Brunner and Daniel Keller, Washington, D.C. 1972, NTIS PB-227-565/9

U.S. Department of Health. Sanitary Land Fill Facts Thomas J. Sorg and H. Lanier Hickman, Washington, D.C. 1970. NTIS PB-204-403

E. Agricultural Activities

More detailed guidance can be obtained from:

U. S. Environmental Protection Agency. Methods and Practices for Controlling Water Pollution from Agricultural Nonpoint Sources. Report no. EPA 430/9-73-015. Washington, D.C. 1973. GPO, $1.10.

F. Silvicultural Activities

More detailed guidance can be obtained from:

U. S. Environmental Protection Agency. Processes, Procedures and Methods to Control Pollution from Silvicultural Activities, Report no. EPA 430/9-73-010. Washington, D.C. 1973. GPO, $1.25

G. Mining Activities

More detailed guidance can be obtained from:

U.S. Environmental Protection Agency. Processes, Procedures and Methods to Control Pollution from Mining Activities, Report no. EPA 430/9-73-011. Washington D.C. 1973. GPO, $3.40

H. Salt Water Intrusion

More detailed guidance can be obtained from:

U. S. Environmental Protection Agency. Identification and Control of Pollution from Salt Water Intrusion. Washington, D.C. 1973. NTIS PB-227-229/2.

6.6 Selection of Best Management Practices

A. General

After identifying instream pollutant loading from nonpoint sources and examining technically feasible nonpoint source controls, the final step in nonpoint source planning is selection of best management practices for existing and new nonpoint sources. This selection process should be based on determining the cost effectiveness and implementation feasibility of alternative controls for reducing existing and potential loading to a level compatible with water quality goals.

It is recognized that information on the level of nonpoint source reduction (from existing sources) needed to meet water quality standards may be difficult to obtain within the period of time in which the initial 208 plan is developed. If existing data are inadequate, a best estimate of needed nonpoint source load reduction should be established and monitoring of major water bodies should be undertaken as necessary to establish this target abatement level. In establishing this target abatement level, waste load allocations and load data for point sources on the segment should be considered. Once the overall target abatement load is established, analysis of nonpoint sources should be directed at estimating the nature and relative magnitude of the loads associated with each category of nonpoint source generating activities. This relative load estimation coupled with the target abatement level will serve as a guide in selecting appropriate Best Management Practices for each nonpoint source category. Also. it is important to establish a continuing monitoring program, as discussed in 6.4 of this chapter, to assess the effectiveness of BMP implementation in achieving and maintaining water quality goals.

It is also recognized that information on cost and effectiveness of nonpoint source controls is difficult to determine. In cases in which quantitative information cannot be adequately ascertained, more flexible procedures for estimation and later determination of cost-effectiveness of nonpoint source controls are recommended.

B. Relationship with Land Use Plan

In determining nonpoint source control measures needed to meet water quality standards, any land use measures that reduce generation of nonpoint sources of pollution should be accounted for as an element in the nonpoint source subplan.

C. Relationship with Management Program

Selection of best management practices should be closely coordinated with the development of a management program to implement controls for point and nonpoint sources. A management program should establish the following legal, financial, and technical support aspects of best management practices (see Chapter 7 for further discussion):

1. Regulatory mechanisms, including legal authority to implement and enforce best management practices;

2. Fiscal programs to provide incentives to adopt best management practices;

3. Technical assistance and interagency coordination to help affected parties comply with regulatory program.

D. Procedure for Selection of Best Management Practices - Existing Sources

1. Cost and Effectiveness of Nonpoint Source

For each nonpoint source category causing a water quality problem, technically feasible control options should be presented. For each option, the cost of the control and the effectiveness of the control in abating different pollutants (either at their source, or their yield to receiving waters) should be presented. Determination of nonstructural control costs should be based upon the opportunity cost of the control as discussed in Chapter 9.

(a) Representative Data for Cost and Effectiveness

Since the cost and effectiveness of nonpoint source controls depend on the exact circumstances in which the control is used, cost and effectiveness vary considerably. For purposes of evaluation, cost data should represent the typical or average situations. This will assure that the cost and effectiveness of the control is neither overestimated nor underestimated if it is being considered for widespread application. Naturally, if the control is only applicable in very specific cases, data should be representative of that specific situation.

(b) Estimation of Cost and Effectiveness Information

Because the precise cause-effect relationship between application of a given control and achievement of a given reduction of wastes to receiving waters is difficult to define, calculation of cost-effectiveness may require preliminary estimation.

Once a particular nonpoint source problem has been identified, the approximate reduction of the source load that could be obtained through a given control can be determined. Since the cost of the control can generally be assessed with some degree of accuracy, the cost-effectiveness estimation enables an overall ordering of the most feasible controls for nonpoint sources.

Plan revision and updating may be necessary if additional monitoring and sampling information reveal the need to consider additional controls.

2. Preliminary Screening of Nonpoint Source Control Options

In order to compare nonpoint source control options, it is necessary to reduce the number of possible options to those that are technically feasible, with adequate documentation of cost and effectiveness. A reasonable number of control options for each significant nonpoint source category should be presented.

3. Development of Alternative Subplans for Existing Sources

Control options for each nonpoint source category should be combined to form alternative subplans. Each subplan should indicate the cost and effectiveness of possible BMP's in meeting the target nonpoint source load reduction levels.

4. Description of Alternative Subplans for Existing Sources

The following information should be presented as an input to the systematic comparison of areawide pollution control alternatives (See Ch. 3.3.D.8):

- Wasteload characteristics of each alternative;
- Total cost of each alternative expressed as its present value or average equivalent value of capital and operating costs for the overall alternative and subsystem components;
- Reliability of each alternative and subsystem included in each alternative;
- Significant environmental effects of each alternative consistent with NEPA procedures, including a specific statement of future development impact;
- Contribution of each alternative to other water-related objectives of the planning area.

E. Procedure for Selection of Best Management Practices - New Sources

The process of selecting controls for existing and new nonpoint sources is essentially the same in that cost-effectiveness and implementation feasibility should be the criteria for choosing controls. However, for most new sources there are often more options for highly effective management measures and these higher levels of abatement should be considered in the selection of best management practices in order to prevent future pollutant increases.

The procedure for selecting best management practices for new sources should be:

1. For each nonpoint source category in which new sources are anticipated, define the level of abatement of pollutants that is needed to prevent new water quality problems.

2. Examine the alternative controls and practices that would meet the needed abatement levels under varying conditions encountered in the area. Representative data for cost and effectiveness should be used. It may be necessary to estimate the abatement levels of the alternatives.

3. Screen the options for best management techniques for new sources and develop alternative subplans for new nonpoint sources;

4. Describe the alternative subplans for new nonpoint sources. The following information should be presented as an input to the systematic comparison of areawide pollution control alternatives. (See Chapter 3.3.D.8).

    - Wasteload characteristics of each alternative, expressed in percent reduction of wasteloads generated from potential new nonpoint sources;
    - Total cost of each alternative expressed as its present value of capital and operating costs for the overall alternative and subsystem components;
    - Reliability of each alternative and subsystem included in each alternative;
    - Significant environmental effects of each alternative consistent with NEPA procedures, including a specific statement on future development impact;
    - Contribution of each alternative to other water-related objectives of the planning area.

CHAPTER 7

MANAGEMENT RESPONSIBILITIES AND INSTITUTIONAL ARRANGEMENTS

7.1 Introduction

This chapter discusses the general responsibilities of the 208 management agencies, the particular tasks associated with the regulatory and waste management programs, and issues associated with the selection of appropriate institutional arrangements.

Institutional arrangements for areawide waste treatment management are the formal structure of affected government units responsible for implementing a 208 plan. Units of government within this structure must have adequate authority to carry out the full range of management responsibilities including, particularly, the regulatory and waste management requirements of the Act. It is also essential that the arrangements assure proper management and accountability for program operations.

Sufficient institutional arrangements and management agency authority for plan implementation may exist in an area when 208 planning begins. However, the specific authority required by the Act to be vested in a designated agency(s) will rarely have been delegated under state law to any particular governmental entity. Where sufficient institutional arrangements and management agency authority do not exist, enabling legislation should be sought and/or arrangements for plan implementation should be created by affected levels of government.

The designated 208 planning agency should take a lead role in formulating institutional arrangements for the area in conjunction with local governments and state agencies responsible for water pollution control. Given the important role of the state in providing data for formulating certain aspects of the plan, issuing discharge permits, approving the plan, and maintaining overall responsibility for water pollution control, it is important to secure the state's involvement in determining institutional arrangements.

7.2 General Management Program

The implementation of a 208 plan depends upon the management agency(s) carrying out a number of related functions for which they should be prepared through adequate authority, resources, and organization.

A. Program Supervision and Coordination

Areawide institutional arrangements must assure that the overall program of waste management and regulation of pollutant sources is coordinated, the plan implemented, and its performance assessed. It is essential that overall supervision of the program and accountability for its operation be achieved through the designation of an agency to possess the authority and resources for program oversight. The selection of the appropriate unit to which this responsibility will be allocated will require careful consultation among all the major institutions affected by the 208 planning process.

A number of arrangements can facilitate coordination. Existing agencies such as regional councils, procedures such as the A-95 review, or mechanisms such as intergovernmental contracts, agreements, or memoranda of understanding may assist in coordinating the components of the 208 plan. Since a major part of the management activities will involve the administration of the regulatory and waste management programs, it is particularly important that the requirements for their operation be carefully considered when allocating responsibilities for general program management and coordination.

B. Continuous Planning

Because implementing a program to abate all sources of water pollution will require continual attention to changing conditions and pollution control needs, continuing planning is an integral part of 208 program management. This continuous planning responsibility must be allocated within the institutional framework.

C. Fiscal Management

A major responsibility of the 208 management institutions will be obtaining and budgeting the financial resources necessary for plan implementation. Among other things, this will mean establishing financial arrangements to support the regulatory and waste management programs, together with arrangements for the funding of continuing planning operations and other administrative expenses. Since financial arrangements are a crucial component in an effective management strategy, their detailed operation should be clearly established prior to plan implementation.

7.3 Regulatory Program

The regulatory program formulated by the 208 planning agency should contain the following elements:

1. The identification of all pollution sources in the 208 area and an indication of which agencies have been designated for their regulation.

2. An indication that the agencies with regulatory responsibility possess the statutory authority or have initiated legislative proposals to obtain such authority to carry out this activity and to utilize the specific forms of regulation called for in the program.

3. An indication of which form(s) of regulation (land use, permits, licenses, pretreatment standards, and associated fiscal policies) will be applied to pollution sources.

4. A specification of the technical requirements to be incorporated into the regulation.

5. Provisions that those affected by regulation will have adequate notice, rights of appeal, and other legal safeguards to encourage full compliance.

A. Agency Selection

Many existing agencies with responsibilities in the 208 planning area should be considered when arranging regulatory responsibilities for specific pollution sources. For the regulation of point sources, these agencies would include local governments of general jurisdiction, sewage treatment agencies, special district authorities, and other agencies assigned public works responsibility. For nonpoint source regulation, agencies might include soil conservation districts, water resource control agencies, fish and game departments, agricultural agencies, or other agencies with resource use responsibilities. For an adequate regulatory program it is essential that all major pollution sources be linked to a specific agency and regulatory procedures to assure plan implementation.

B. Statutory Requirements

The Act requires that a 208 regulatory program include the following:

1. To the extent practicable, provide for waste treatment management on an areawide basis and for identification, evaluation, and control or treatment of all point and nonpoint pollution sources;

2. Regulate the location, modification, and construction of any facilities within the area which may result in any discharge in such area;

3. Assure that industrial or commercial wastes discharged into any treatment works in an area meet applicable pretreatment requirements.

The regulatory program is also affected by Sec. 208(b)(2)(F-K) which requires that 208 plans: 1) set forth procedures and methods (including land use requirements) to control to the extent feasible nonpoint pollution sources related to agriculture, silviculture, mining, and construction; and 2) establish processes to protect ground and surface water quality through controls on disposition of residual wastes and on land disposal of pollutants.

To meet the requirements of the Act, the 208 management agency(s) will need clear, explicit, and overall authority for their regulatory activities. They should not assume that the authority is implicit or inherent in existing law. In some cases, the authority necessary for some of the regulatory tasks may be present in governmental entities, or combinations of them, to be included in the 208 institutional arrangements. In other cases, additional authority may be necessary to carry out specific regulatory responsibilities. This may require a delegation of authority from regional, state, or federal agencies or new state legislative enactments.

Thus, in some cases it may be necessary to obtain new authority. In other cases, it may be possible to acquire necessary regulatory authority by amending existing legislation. Instead of enacting new legislation or amending existing laws, it may be advisable to include in the institutional arrangements, agencies which already have the needed authority but which may not normally be involved in water pollution control. Examples of such agencies would include those with regulatory power over land use and construction activity.

C. Regulatory Controls

The regulatory controls are the specific measures used to regulate a pollution source. There are several general forms of regulation which may be used individually, or in combination, for regulatory purposes.

1. Land Use

Many land use control measures could be used in a regulatory program. These include:

--zoning authority, or participation in zoning decisions of other agencies;

--special zoning authority over critical areas such as shorelines and flood plains;

--control of subdivision development to assure that portions of land critical to water quality are reserved for uses consistent with the 208 plan;

2. Permits and Licenses

It is often possible to create permit requirements and/or licenses to accomplish many 208 regulatory objectives:

--pretreatment permits may be required for effluents entering wastewater treatment facilities to assure desired water quality;

--permits for many point sources are already required under the National Pollution Discharge Elimination System;

--permits for other point sources, or licenses for activities generating nonpoint pollution, may specify criteria for siting, design and performance of facilities and operations;

--private users of wastewater treatment facilities may be required to obtain permits for hookups to public wastewater systems.

The effectiveness of any permit program depends on the availability of sanctions and adequate staffing. It is important that 208 planning agencies give careful attention to providing adequate sanctions for the program and to assuring the availability of resources necessary to implement them.

3. Standards

In some cases, 208 management agency(s) may have the ability to create or to modify water quality standards. State and local agencies may, in many instances, be able to set water quality standards at more stringent levels than the national standards. Like the use of permits for regulatory purposes, the effectiveness of the program depends upon the availability and use of effective sanctions for noncompliance and adequate staffing.

4. Fiscal Policies

Various fiscal policies, such as taxation and pricing, may be used to complement the regulatory program.

(a) Pricing Policy

Pricing policy can be used to reduce the flow of wastewater through metering. In this regard, there are two decisions which must be made. The first, for many areas, is whether or not to meter. Unless there are meters, charges cannot be assessed for incremental use, and therefore a pricing policy cannot affect flow and waste reduction. Savings from a reduction in water and wastewater flow must be balanced against the costs of metering. Relevant savings and costs apply to both the water and waste treatment systems.

If a decision is made to meter, or to meter certain classes of users, the second decision is to determine the rate levels. To encourage cost-effective choices on the part of users, economic analysis indicates that at the margin of use, rates should equal marginal costs. Rates should reflect the incremental cost attributable to flow, the incremental cost of BOD removal, etc.

In practice, and in current guidelines, the emphasis on developing user charges has been on identifying average costs attributable to flow removal of BOD or other constituents. While rates based on such estimates are not ideal, they have been effective in inducing wastewater flow reduction and industrial process change.

(b) Taxation Policy

Differential assessment ratios, where legal, can serve as an inducement to keep land in a nonurban classification for open space or low density. Such a policy permits owners to maintain land in its present use, but does not prohibit its sale for a more intensive use at a later date. The policy therefore tends to slow down the rate of development, without completely prohibiting it, but gives no assurance that the most environmentally sensitive areas are given the most protection.

D. Technical Requirements

To determine whether compliance with a regulatory program is being achieved, the program should include a specification of the type of pollutant to be regulated from each pollution source and the level of control which is sought. This regulatory goal should be clearly understood by those responsible for assuring compliance and those regulated by the program. A more detailed discussion of technical requirements may be found in Chapters 3.3, 5, and 6.

E. Procedural Requirements

The regulatory program should incorporate adequate compliance procedures and arrangements to protect the interests of those affected by the program. The procedural arrangements in the program should include at least the following:

1. A procedure for giving adequate notice to those regulated by the plan concerning when, where, and how the regulation will apply to them.

2. Information to regulated parties specifying how they are expected to conform to the regulatory program.

3. A method for hearing and responding to grievances among those affected by regulation.

4. A notice and hearing procedure for major regulatory decisions made by the management agency(s).

5. Provisions for public participation in the administration of the regulatory program.

In order to devise an effective regulatory program to implement 208 plans, it may be useful to take an inventory of existing regulation for each pollutant source category. Each category may be identified together with the agency responsible for its regulation, the legal authority for such regulation, the form of regulation, technical standards for assuring compliance, and the necessary procedural safeguards involved. Based upon an assessment of the adequacy of existing regulation to deal with each pollutant problem, necessary modification of existing regulatory approaches can be proposed. The need for additional legislation to establish adequate regulation of pollution sources should be assessed as early as possible in the planning process so that action may be taken to obtain the necessary regulatory authority.

7.4 Waste Management Program

A waste management program consists of all those activities necessary to create, operate, finance and enforce the areawide waste treatment management plan created through the 208 planning process. It is particularly important that management agencies obtain the required authority for these tasks as described in Section 208(c)(2) of the Act and that they develop effective management strategies for implementing these responsibilities. Management agencies should not rely upon implied powers for their authority but should obtain explicit authority for their tasks. It is very likely that some of the required authority will not be possessed by management agencies when 208 planning begins and will have to be explicitly obtained before the 208 management phase begins. The waste management tasks include all those mentioned below.

A. Securing Comprehensive Authority

Section 208(c)(2)(A) requires that there be adequate authority "to carry out appropriate portions of an areawide waste treatment management plan....". The tasks for which this authority is needed are described in Sec. 208(b) and include: municipal and treatment works, stormwater management, residual waste management, and nonpoint source management. Usually, this authority will be distributed among several agencies in the 208 area. An important planning task is to allocate, and sometimes to consolidate, this authority among those units responsible for the management program. The plan must identify agencies necessary to carry out the plan.

Section 208(c)(2)(B) requires that there be adequate authority to "manage effectively waste treatment works and related facilities ..." in conformance with the plan. In this regard, the broad definition of "treatment works" set forth in Sec. 212(b) and discussed in Chapter 5 should be kept in mind. Institutional arrangements must incorporate some means of coordination among the agencies involved in administering the plan so that conflicts can be resolved and the plan properly enforced.

B. Operations Management

The Act requires in Section 208(c)(2)(C) that there be adequate authority "directly or by contract, to design and construct new works, and to operate and maintain new and existing works as required by [the] plan...". Generally, existing waste treatment agencies already have this authority. However, where works are to be located outside the immediate jurisdiction, or when discharges from outside the immediate jurisdiction are to be accepted, adequate enabling legislation to meet this requirement may have to be enacted. When approval of a superior agency is required, it should be secured before a construction grant application is made. The management plan should provide sufficient manpower, fiscal resources, and administrative expertise to assure that the customary management tasks associated with such a waste treatment operation are properly discharged.

C. Financing

The Act requires in Section 208(c)(2)(D) that there shall be adequate authority "to accept and utilize grants, or other funds from any source for waste treatment management purposes." Most waste treatment agencies have this authority under state law. Where such authority does not exist, enabling legislation should be passed. Some states have arrangements permitting state agencies to redistribute grants among local government units, but the Act requires that the full federal share of funding for treatment agencies be distributed to the local units.

Section 208(c)(2)(E-G) deals with other authority required in relation to financial arrangements. It should be noted that Sec. 204(b)(1)(A) and (B) require that all user charge arrangements must assure that each user pay his proportionate share of service costs and that there be full industrial cost recovery in the program. Many existing arrangements for assessing user charges are not likely to meet these tests. See Chapter 8 for a detailed discussion of user charges.

In addition to these specific statutory requirements, the management agency(s) must be prepared to deal with the customary fiscal responsibilities for program management, including the raising and transfer of funds internally, and the apportionment of responsibility for financing operating costs of the program among the constituent units.

D. Sanctions

An effective waste treatment program includes sanctions. Section 208(c)(2)(H) requires that there be adequate authority "to refuse to receive any wastes from any municipality or subdivision thereof, which does not comply with any provisions of

[the] approved plan...". This authority, which may be exercised by an appropriate state agency, would be used only in extreme cases, and only if such measures as negotiations, fines, additional charges, moratoria, and court settlements have proven unsuccessful.

The Act also requires in Sec. 208(c)(2)(I) that there be adequate authority "to accept for treatment industrial wastes." This authority also extends to refusal of wastes which do not meet applicable pretreatment requirements as mentioned in Sec. 208(b)(2)(C)(iii). Other grounds for refusal exist when an industry does not comply with the 208 plan or violates applicable state or federal discharge laws.

7.5 Basic Issues in Management Agency Designation

Many issues will have to be resolved to determine the management agency(s) and institutional arrangements necessary to meet the requirements of the Act. The basic issues are:

1. What agency will exercise responsibility for overall program supervision and enforcement?

2. To what extent will the affected state be involved in the areawide institutional arrangements?

3. Will implementation responsibility be vested in a single agency or diverse agencies?

4. If consolidation of responsibilities is undertaken, will it be accomplished through unification or intergovernmental contracts and agreements?

5. What measures will be taken to assure that local land use decisions do not adversely affect water quality?

6. To what degree will the state delegate some of its regulatory or supervisory authority to substate entities and general purpose local governments?

7. To what degree will agencies be supported from tax revenue?

8. How much financial assistance can be expected from the state for construction, operation, and other functions?

Below is a chart which suggests where responsibility for major elements in the management of the 208 plan might be located:

POSSIBLE LOCATION OF MAJOR RESPONSIBILITIES FOR 208 MANAGEMENT ACTIVITIES

Responsibilities	City/County	Regional: Representatives of General Purpose Government	Regional: Special Districts	State
General Management				
--supervision/coordination	X	X	X	
--continuous planning		X		
--fiscal management	X	X	X	
Regulation				
--land use and other land management controls	X			X
--permits and licenses	X		X	X
--standards				X
--fiscal policies	X		X	X
Waste Management				
--operations management	X	X	X	
--financing	X	X	X	
--sanctions	X			X

A. Options in Designation

The choice of agency or agencies designated to carry out 208 program responsibilities will probably be influenced by the number of local governmental jurisdictions that either operate waste treatment systems or exercise authority over land use, stormwater runoff, and nonpoint source controls. Generally, the options for designation are:

1. Single Planning and Management Agency

One option is to establish a single planning and management agency with the same geographical jurisdiction as the 208 area. In some situations where a single governmental jurisdiction encompassing the entire 208 area already exists, it may be assigned both the planning and management responsibilities. This would facilitate closer coordination between planning and management than would be possible if these two responsibilities were assigned to separate agencies, and would also achieve greater economies of scale in carrying out plan responsibilities. Where such an agency is based partly on a Council of Governments (COG) or regional planning agency which has been designated as a clearing house agency under A-95, final approval of specific projects in the 208 area can be expedited. Where A-95 authority is lacking, adequate provisions should be made to insure that elected officials are included on the planning agency board so as to meet the representation requirements of the Act.

2. Single Planning Agency and a Single Management Agency

Another option is to divide the planning and management responsibilities between two separate agencies. This would make day-to-day coordination more difficult, but might facilitate approval of specific projects if the planning agency has A-95 authority. A previously established COG or regional planning agency could be utilized as the planning agency for 208. Since such organizations already have local elected officials on their boards, the representation requirements would automatically be met. Where separate management agencies are involved in waste treatment, consolidation of such agencies would have to be brought about, entailing some loss of local authority. Economies of scale could also be attained as in the first option above.

3. Single Planning Agency and Plural Management Agencies

A third option would be a single planning agency and more than one management agency. This would allow those management agencies already providing waste treatment service to continue with a minimum effect upon their internal administration. While coordination between the planning agency and the management agencies would be more difficult, individual government jurisdictions could retain their own waste treatment agencies and other authority. This option, therefore, would permit the maintenance of existing institutions and agencies to a greater degree than the other options. Representation requirements of the Act could be met by the planning agency as in the other options. Economies of scale in plan implementation, however, would not be likely due to fragmentation. Two approaches to securing supervision and enforcement in plan implementation should be considered:

a. A single supervisory agency with clear responsibility and resources for overall management, coordination, and plan enforcement.

b. Apportionment of some of the responsibilities for plan supervision and enforcement among several agencies with one given the lead role.

The advantage of fixing responsibility for supervision and enforcement of the plan upon a single agency is clear accountability and greater coherence in conflict resolution, plan coordination, and overall management activities. Dividing responsibility for program supervision and coordination among several agencies while designating one as the lead agency may disturb existing agency powers and relationships less and reduce the difficulties of formulating a satisfactory management scheme.

B. Intergovernmental Agreements

No matter which of the above options is chosen, formal intergovernmental agreements must be made. Adjustments in the authority and in services of local, regional or state governments in a 208 area may be effected by different forms of legal agreement and statutory authorization.

1. Contract

Where a single agency already encompasses the entire §208 area, other participating local units (county, metropolitan government, or metropolitan special district, etc.) of government may contract with it to provide the services required.

2. Joint Exercise of Powers

Where they do not already exist, consolidated agencies may be established jointly by the participating local units of government. Interlocal contracts or agreements may be utilized in such joint exercise of powers.

3. Delegation of Responsibility

Where a new areawide agency is established, the state may transfer functions to it from other local, regional, or state agencies through appropriate enabling legislation.

C. A-95 Review

In accordance with OMB (Office of Management and Budget) Circular A-95 Revised, dated November 13, 1973, all applicants under federal programs which provide assistance to state, local, and areawide projects and activities planned on a multijurisdictional basis must notify the appropriate state and areawide planning and development clearinghouse for review and comment. The proposed application will be reviewed for its consistency with areawide plans including comprehensive planning, environmental concerns, water supply and distribution systems, sewage facilities and waste treatment works, and land use. In most cases, either a regional planning agency or COG serves as the regional clearinghouse, and, as mentioned above, may be utilized as the areawide planning agency under §208. As part of its review responsibilities, the state should ensure that any proposed applications are consistent with basin planning under §303. On the national level, EPA reviews the annual certification of state plans.

CHAPTER 8

FINANCIAL ARRANGEMENTS

8.1 Introduction

Financial planning is an integral part of the 208 areawide planning process. Financial arrangements necessary for implementing the 208 plan, and consistent with the capability of the 208 management agency(s), should be included in the plan.

This chapter identifies problems which may arise in complying with the financial requirements of the Act. It does not describe methods or procedures for funding capital construction, for raising revenue, or for assessing waste treatment charges, since the applicants are best able to determine financing methods most suitable for their particular problems and authorized under their enabling legislation.

These problem areas are divided into three categories:

A. Capital construction costs

B. Operational costs (revenue)

C. Indirect (overhead) costs to be financed

With respect to each of these financing arrangements, pertinent provisions of the Act and specific problems are set forth below. Short-term and long-term budgeting and other financial activities are also discussed.

8.2 Requirements of the Act

Provisions directly and indirectly affecting financial arrangements are contained throughout the Act with those specifically affecting 208 areawide waste treatment management set forth in Title II. To comply with these various requirements, there should be a unified approach to planning and budgeting the financial arrangements.

A. Capital Construction Costs

1. §208(b)(2)(E) requires that the areawide management plan include identification of the measures necessary to carry out the plan including financing and the costs of carrying out the plan within the necessary period of time. This applies to all capital costs associated with point and nonpoint source controls.

2. §204(a)(4) requires that the applicant proposing to construct treatment works agree to pay the non-Federal costs of such work.

3. §204(b)(1)(C) provides that the Administrator shall not approve any grant for any treatment works unless he shall first determine that the applicant has the financial capability to insure adequate construction, operation and maintenance of the treatment works throughout the applicant's jurisdiction.

4. §208(c)(2)(C) requires that the waste treatment management agency(s) have adequate authority directly or by contract to design and construct new works and operate and maintain them.

5. §208(c)(2)(D) requires that waste treatment management agency(s) have adequate authority to accept and utilize grants or other funds from any source for waste treatment management purposes.

6. §208(c)(2)(F) requires that the waste treatment management agency(s) have adequate authority to incur short and long term indebtedness.

7. §204(b)(1)(B) provides that the Administrator shall not approve any grant for any treatment works unless the applicant has made provision for industrial cost recovery (recovery from industrial users of the portion of the Federal share of treatment works construction cost attributable to industrial waste treatment).

8. Section 12 of the Act provides for an Environmental Financing Authority under the Secretary of the Treasury. This Authority is established to assure that inability to borrow necessary funds on reasonable terms does not prevent state or local public bodies from carrying out waste treatment works construction projects eligible for assistance under the Act. The Authority is authorized to purchase the financial obligations of these public bodies to finance the non-Federal share of such construction.

B. Operational Costs and Assessment of Revenue

1. §204(b)(1)(C) provides that the Administrator shall not approve any grant for any treatment works unless the applicant has financial capability to insure operation and maintenance of the treatment works.

2. §208(c)(2)(E) provides that the waste treatment management agency(s) must have adequate authority to raise revenues, including the assessment of waste treatment charges, to implement all elements of the plan.

3. §208(c)(2)(G) provides that the waste treatment management agency(s) must have adequate authority to assure, in implementing an areawide waste treatment management plan, that each participating community pays its proportionate share of the treatment costs.

4. §204(b)(1)(A) provides that the Administrator shall not approve any grants for any treatment works unless the applicant has adopted a system of user charges assuring that each recipient of waste treatment services will pay its proportionate share of the cost of operation and maintenance (including replacement) of any waste treatment services provided by the applicant.

C. Indirect (overhead) Costs to be Financed

1. Continuing planning is an indirect cost to be financed by the management agency. §208(b)(3) requires that the areawide waste treatment management plan shall be certified annually by the governor of the state or his designee as being consistent with the applicable basin plan. The interim grant regulations (40 CFR Part 35.1054-2(e)) specify that the grant application include "A statement by the applicant that the planning process will become financially self-sustaining and provide for annual update of the plan once the initial plan is developed and approved."

2. §208(b)(2)(F)-(K) provide that the areawide management plan shall include processes to identify and/or control nonpoint sources of pollution. Nonpoint source planning is an especially important part of continuing planning.

3. §201(e) provides that the Administrator shall encourage waste treatment management which results in integrating facilities for sewage treatment and recycling. It further provides that such integrated facilities shall be designed and operated to produce revenues in excess of capital and operation and maintenance costs and that such revenues shall be used by the designated regional management agency to aid in financing other environmental improvement programs.

8.3 Specific Problem Areas

A. Capital Construction Costs

Due to the number and variety of methods for financing waste treatment management under state and local laws, each plan should include the broad range of financial arrangements available rather than follow any rigid formula. Some requirements of the Act should present few if any difficulties with regard to financial arrangements; others are more likely to cause problems. Financial arrangements which should be relatively easy to provide are as follows:

1. Capital funds may be raised or generated from the general fund, particularly if the applicant is a governmental unit of general jurisdiction.

2. Capital funds may be generated from grants or funds from any other source. In some instances, matching funds may be required.

3. The capacity and ability to contract indicates a limited ability to generate short-term indebtedness.

4. The capacity to incur short-term indebtedness may be demonstrated by the ability to issue bond anticipation notes, grant anticipation notes, or to borrow from state agencies. Such short term indebtedness must, of course, comply with constitutional limitations on borrowing and with any state or local statutory requirements.

5. The capacity to incur long-term debt may be demonstrated by the capacity to issue general obligation bonds, revenue bonds, or the capacity to borrow from state agencies. Exercise of this capacity to borrow is of course limited in many instances by constitutional or statutory provisions. There must also be compliance with state and local statutory requirements for the issuance of bonds or the incurring of such long-term indebtedness.

Areas in which problems may be encountered in complying with the Act include the following:

1. The industrial cost recovery requirements of the Act are specifically covered in 40 CFR 35 Subpart E, of the grant regulations. Industrial cost recovery charges may be allocated on a systemwide basis provided that the treatment works project for which the grant is made is substantially interconnected, with a goal to be completely interconnected physically to all other portions of the system.

Where revenue bonds are used to finance the local share of construction costs, funds designated for bond repayment should be accounted for separately from those received in compliance with industrial cost recovery requirements. This should avoid any problem in establishing priorities for repayment to revenue bond holders entitled to receive the industrial cost recovery share of total revenues. In instances where industrial users must make long-term commitments for repayment, provision might be made for transfer of this commitment, in order to facilitate industrial growth and change within the area. Since it is implied that a long-term commitment to repay is in exchange for provision of services to treat the user's industrial wastes, such rights to services should be transferable. Both the commitment and the right to services should be transferable, subject, however, to approval by the waste treatment management agency.

2. In the event of consolidation of two or more areas or agencies, each of which had incurred indebtedness and other contractual obligations in supplying waste treatment services, a legally acceptable method must be set forth for the consolidated agency to assume payment of the debts and obligations. Personnel contracts, retirement benefits, long-term supply contracts, etc., should be paid particular attention.

3. In the event of treatment system consolidation, problems may arise over the new waste treatment management agency reimbursing the participating agencies for the value of their existing facilities and assets. A fair and uniform method of determining the values of these assets and a legally acceptable method of handling the transfer should be set forth.

B. Operational Costs and Revenue Assessments

1. User charges. 40 CFR 35 Subpart E, and related guidelines provide the basis for establishing user charges. As set forth in these regulations and guidelines, the Act requires that each recipient of waste treatment services pay its proportionate share of costs of operation and maintenance. Charges based on property values only will not suffice to satisfy this requirement, except in cases where such charges have been used historically, the change-over would be costly and disruptive, and the goal of proportionality among user classes can be achieved by such systems. Uniform rates on volume among classes of users will suffice if the classification reflects the differences in cost of treatment among classes of users.

2. Participating communities' proportionate shares. In determining each participating community's proportionate share of treatment costs, the differentials among communities should be explained and justified. In the event that all participating communities are charged on the same basis, justification should be given. The provisions and effects of interlocal agreements and contracts to supply waste treatment services should be reviewed and set forth. The methods of charging users within each of the participating communities should be defined. The user charge requirement cannot be avoided by interlocal agreements or contracts to supply waste treatment services. User charge requirements must be reflected in determining the participating communities' proportionate shares of treatment costs.

C. Indirect (Overhead) Cost to be Financed

1. The amount and source of funds for ongoing planning should be set forth in the budget, and should include provision for items such as discharge source inventory, monitoring, surveillance, and performance evaluation as needed to supplement state support.

2. The ongoing planning process also requires public participation. The cost of providing information and encouraging public participation should be budgeted.

3. To the extent that the areawide waste treatment management agency is involved in the ongoing identification and control of nonpoint sources of pollution, the cost should be budgeted and the source of income indicated. If performed by state level agencies, this should be noted.

8.4 Budget Preparation and Supporting Documentation

A. The plan should include a projection of financial means to provide treatment works necessary to meet the anticipated municipal and industrial waste treatment needs of the area over the 20-year period.

B. A more detailed 5-year projection including capital improvement budgeting and cash flow should be provided. It should include start-up costs, carrying charges during the first years of operation and similar nonrecurring costs associated with the implementation of a new treatment works or waste treatment management plan.

C. The legal authority of the agency(s) to undertake the financing necessary for plan implementation should be described in an opinion letter from the legal counsel for the agency(s). This opinion letter could also be prepared by counsel experts specialized in the field of bond financing.

D. The financial capacity of the agency(s) to implement the plan should be described in a report prepared by the independent auditor for the agency(s). For example, the extent to which the agency(s) has unused bonding capability should be identified if general obligation bonds are to be used as a method of financing.

E. The method for obtaining budget approval for the 5 year capital improvement budget should be described, and should indicate the schedule for obtaining such approval.

F. The relationship of the regulatory program needed to enforce the plan (see Chapter 7) to the budget should be described. For example, the use of fiscal and regulatory means to limit and control new sources of pollution will influence the amount of new sewage treatment capacity needed in an area. The adequacy of the budget for sewage treatment financing is thus dependent on the adequacy of the area's control over location and generation of new pollutant sources.

CHAPTER 9

DIRECT RESOURCE COSTS

9.1 Introduction

The Act requires that areawide plans consider alternative methods for waste management, that the cost of carrying out alternatives be identified, as well as their economic, social and environmental impacts, and, generally, that the choice of alternative be "cost efficient" or "cost effective" -- that is, water quality goals should be met at minimum cost.

As cited in Chapter 1.7, cost-effectiveness analysis is defined as the systematic comparison of alternatives to identify the solution which minimizes total costs to society over time and reliably meets given goals or objectives. Total costs to society include resource costs plus economic, social, and environmental costs. The analysis involves identification and study of the tradeoffs among resource costs, environmental effects and other economic and social aspects of the alternatives, leading to selection of the best plan.

Resource cost (discussed in this chapter) refers to the value of goods and services used in a given project and includes capital cost as well as operations, maintenance and replacement cost. Resource cost may usually be measured in monetary terms; economic, social and environmental effects, discussed in the next chapter, are more difficult to quantify, and must be described and evaluated in a more subjective way.

9.2 Basic Concepts in Identifying Resource Costs

A. Economic Cost

In considering the cost of implementing a plan, it is necessary to distinguish between outlays and economic cost. In many instances cash outlays adequately represent cost, but sometimes a resource is used, with no cash outlay. The cost in such a case is the value of the resource in its best alternative use -- its "opportunity cost." For example, acquiring public land for a treatment plant may involve no cash outlay, but may have an opportunity cost in terms of foregone recreation or commercial use. If opportunity costs are not considered, plan selection will be biased toward those options which do not require outlays, despite their other costs. Moreover, the concept of opportunity cost accounts for the cost to the community and nation as a whole in evaluating alternative plans, not merely the cost to one party or another.

B. Price levels

Where costs are estimated for future periods, they should be stated in terms of base period dollars. Future costs should not reflect any expected overall increase in wages and prices, unless there is reason to expect significant changes in relative prices during the planning period. For example, due to the present energy shortage, long term prospects are for higher energy costs. While it is difficult to predict how much costs will rise, alternative plans should be tested for one effect of higher energy costs.

C. Interest rates

Discounting is a way to account for the opportunity cost of funds invested in a project, in the sense that the funds could also have been used productively in the private sector of the economy or in some other public project. The applicable discount rate determines the optimal choice between capital expenditures now versus higher operating costs in the future, the optimal amount of reserve capacity to build, and so on.

In discounting, the costs of a plan are stated in terms of their present values. That is, future costs are discounted at an applicable rate of interest back to some initial starting date, and added to the initial capital costs. Alternatively, the present values may be converted into equivalent annualized values. Standard procedures are described in engineering economics and business finance texts.

The interest rate to be used in evaluating water-related public projects is prescribed by the Water Resources Council, a Federal inter-departmental group, in its "Principles and Standards for Planning Water and Related Land Resources", as amended by PL 93-251 (1974). The rate specified by the Council is based on the interest rate on Federal Securities with maturities of 15 years or more. The rate to be used for each fiscal year is determined by the Council on July 1. For fiscal years 1975 and 1976, the rates are 5 7/8% and 6 1/8% respectively.

9.3 Specific Cost Questions

A. Sunk Costs and Salvage Values

Sunk costs and salvage values refer to capital assets in existence at the beginning or end of a program.

For simplicity, investments and cost commitments made prior to or concurrent with the planning study are regarded as sunk costs and are not included as a cost for plan evaluation and comparison. Such investments and cost commitments include, for example: (1) investments in existing wastewater treatment facilities and associated lands to be incorporated into a plan; (2) outstanding bond indebtedness. However, if inherited assets were to be disposed of in one alternative -- for instance, a small treatment plant scrapped and the land sold -- their sale value would be treated as a credit to that plan.

Salvage value. At the end of the planning period, land for treatment works (including that used as part of the treatment process or for ultimate disposal or residues) should be assumed to have a salvage value equal to its market value at the time of the analysis, less any costs required to restore the lands to pre-project conditions. Salvage value of land reclaimed by land treatment of sludge disposal should be estimated as the value of the reclaimed land. Rights-of-way and easements should be assigned a salvage value not greater than the market value at the time of the analysis.

Permanent structures should be assumed to have a salvage value at the end of the planning period if those structures can be expected to continue fulfilling their planned use. Salvage value should be based on the remaining functional life of the structure using a straight line depreciation over the assumed functional life of the structure. The same approach applies to process and auxiliary equipment that will have usable value at the end of the planning period.

B. Capital and Operating Costs

Elements of total cost include capital construction cost, annual operation and maintenance costs, and equipment replacement costs.

As set out in EPA cost-effectiveness guidelines (40 CFR 35), capital costs for facilities include: cost of land, relocation and right-of-way and easement acquisition; design engineering field exploration and engineering services during construction; contractors' costs, including overhead and profit; administrative and legal services, including cost of bond sales; and startup costs such as operator training. Contingency allowances consistent with the level of complexity and detail of the cost estimate are also included.

The capital costs of a plan would include those incurred by both public agencies and private parties. These two categories of cost are utilized in the summary table shown in Chapter 12. Treatment facilities built by industrial companies for direct discharges or for pretreatment would be included in private costs.

Where waste and flow reduction measures are carried out by a large number of industrial and household dischargers, it is difficult to estimate the private costs. Unless the costs have a bearing on the choice of a cost-effective plan, such estimates are unnecessary.

Annual operating and maintenance costs for each alternate plan must be established. These costs should be adequate to ensure effective and dependable operation and should include all costs for operating and maintaining the facilities under study including power, labor, parts, materials, overhead, chemicals and repair or replacement of equipment and structures.

Cost-effectiveness analysis requires establishing a service life for each component and salvage values for components having service lives longer than the planning period. The following service lives are to be used, unless other periods can be justified:

Land	Permanent
Structures	30-50 years
Process Equipment	15-30 years
Auxiliary Equipment	10-15 years

C. Administrative Costs

Areawide waste planning and management is likely to include a number of ongoing costs for activities not always associated with sewage facilities management. These activities include monitoring of streams, monitoring the waste characteristics of major industrial dischargers, periodic checks of infiltration and inflow, records of storm and runoff characteristics, collecting and analyzing data on residential water use, etc. These functions are as important to the effectiveness of a plan as the physical units in place. The costs may not vary significantly in alternative plans, but should be included in financial projections. Recovery of costs by direct charges -- e.g., permit fees, monitoring fees, etc. -- should be considered and evaluated.

D. Accuracy of Cost Estimates

The accuracy of cost estimates for all point and nonpoint elements of 208 plans should be sufficient to assure the selection of the most cost-effective solution. Gross cost estimates ordinarily suffice for preliminary screening. Plans selected for detailed evaluations should be compared on the basis of the following types of information:

- Unit process costs associated with the different wastewater and sludge treatment processes considered. The unit costs should be applicable to the locality or region.

- Preliminary engineering layouts, quantity estimates, and unit costs for the sewer lines and appurtenant works. Unit costs should be representative of the area, based on recent comparable projects.

- Market value of land or easements required for facilities.

The above detail of cost estimates should be sufficiently refined to provide a basis for the 5-year financial budget stipulated in Chapter 8. Such estimates might be based upon preliminary engineering layouts and designs, taking account of facilities in place. Should the more refined estimates of the selected system differ considerably from the previous estimates, the prior evaluations of alternatives should be revised. As discussed in Chapter 8, financial budgets should cover the first five years; therefore, the level of detail for cost estimates should be greater for that period.

E. Present values

Using the interest rate discussed in 9.2.C, the costs for construction and operations, by year, should be discounted to the proposed plan initiation date to obtain the present value (or, what is much the same thing, the annualized value) of the plan alternatives. An example is given in EPA Guidance for Facilities Planning, January 1974.

CHAPTER 10

PUBLIC PARTICIPATION

10.1 Introduction

A. Need for Public Involvement

The success of a 208 plan depends on its acceptance by affected units of local government. It is important that the general public in the 208 area be actively involved in plan development and that public participation in the later management phase of the plan be encouraged. Due to the complexity of the 208 planning, it is necessary to provide a structured program of public involvement to assure adequate exchange of information and opinion between the public and the planning agency.

B. Legal Requirements

Public participation is an important element in any water resources planning effort. Section 101(e) of the Act states:

> Public participation in the development, revision, and enforcement of any regulation, standard, effluent limitation, plan or program established by the Administrator (of EPA) or any State under this Act shall be provided for, encouraged, and assisted by the Administrator and the States.

This means that public participation must be encouraged during the development of the 208 plan and that adequate provision should be made in the plan for public participation in the work of the management agency to implement the plan.

The Environmental Protection Agency has published regulations specifying the minimum guidelines for public participation in water pollution control efforts. These regulations (40 CFR 105) require state agencies to do the following:

1. To provide technical information "at the earliest practicable times and at places easily accessible to interested or affected persons and organizations" and to assist the public in understanding and responding to water programs.

2. To have "standing arrangements for early consultation and the exchange of views with interested or affected persons and organizations on development or revision of plans, programs or other significant actions prior to decision-making."

3. To maintain a current list of interested persons and organizations to be notified, when appropriate or required by law, concerning agency hearings, rule-making or other significant actions.

4. To develop procedures to insure that information and evidence concerning water programs, when submitted by citizens, will receive proper attention. In particular, public reporting of water pollution law violations is to be encouraged.

5. To provide "full and open information on legal proceedings under the Act" to the extent consistent with court requirements and to a degree that does not prejudice the conduct of litigation.

6. To provide opportunities for public hearings on proposed regulations where appropriate or required by law. Public hearings should be conducted whenever there is sufficient public interest in a matter. Whenever doubt arises concerning the degree of public interest, the question should be resolved in favor of a hearing or, if necessary, by providing an alternate opportunity for public participation. EPA regulations on procedures for public hearings should be followed if state agency procedures are less stringent. (See 40 CFR 105.7 for guidelines concerning public hearings).

The activities listed represent only the minimum steps that local agencies should undertake to provide for public involvement. In many instances, however, there are alternative methods for accomplishing this public involvement. The rest of this chapter discusses ways to comply with these requirements through a variety of formal programs of public participation.

10.2 Public Participation Program Development

A. Relationship with the Planning Process

A program for public involvement should be formulated as soon after designation of the 208 agency as possible. The program, an integral part of the planning process, should outline the specific means for public participation at each step in the process, including development and modification of the work program. The planning process should be designed so progression from one stage to another cannot take place without certain well-defined inputs from the public.

B. The Major Phases in the Planning Process

The planning process involves several general phases, although planners may define the specific tasks within the phases somewhat differently. The phases are important because they are the activities around which a program of public participation should be organized. The 208 planning process will include the following phases.

1. Establishment of Goals and Objectives

During the first stage of a 208 plan, the planning agency should establish channels of communication with the public. Citizen opinion should be sought on the following issues:

a. The identification of water quality problems and priorities for resolving these problems.

b. The relative importance of water quality goals in relation to other community goals.

c. The role that water quality management can or should play in achieving community goals.

d. The use of land use controls and a regional approach to waste treatment to protect water quality.

e. The use of land disposal and other innovative or controversial pollution control technologies.

2. Design of Alternatives

Since water quality planning is but one aspect of community planning, it is important, particularly in the design of alternatives, that the planning agency consider how community goals may conflict or be compatible with water pollution control alternatives.

Citizen views should be solicited on the compatibility of various water pollution control approaches (municipal and industrial source control, land use and land management control for point and nonpoint sources, and control of residual waste) with other community goals.

Citizen views concerning timing, rate, and location of future development and land uses (particularly housing, industrial, commercial, transportation, open space, resource recovery and recycling) are critical in determining the suitability of the pollution control approaches.

It is also necessary to solicit public reaction to possible management alternatives for implementing the plan. Compatibility of the management alternatives with the following kinds of areawide planning and implementation agencies and levels of government may be considered.

- regional comprehensive planning agencies
- general purpose local governments
- sewer districts
- air quality control agencies
- soil conservation districts
- solid waste planning agencies
- transportation planning agencies
- regional economic development agencies
- regional parks and recreation agencies

3. Impact Assessment

Since the evaluation of certain aspects of the plan is largely subjective, it is important that those affected by the plan be involved in assessing its impact. Special efforts should be made to obtain the reaction of those individuals and institutions that would bear the responsibility for financing, construction, operations, monitoring, and enforcement. The public should also have the opportunity to request further study of plan impact.

4. Recommendation and Acceptance of the Final Plan

During this stage the planning agency should consider any reasons why the least-cost plan should not be chosen, such as the attainment of additional benefits from increased expenditures, or the minimization of undesirable social, economic, and environmental impacts. Public comment that accurately reflects community goals and preferences is therefore needed on plan impact.

At this stage it is vital that elected officials who are responsible for local approval of the recommended plan are made aware of public comments and opinions. This is a major responsibility of the entire public participation program.

5. Plan Implementation

The public should be actively involved in the many activities necessary to implement an areawide plan. Public involvement may be particularly helpful in assuring that the plan is effectively implemented and in informing responsible officials of the plan's impact in the area. Public understanding and support for the area plan may be encouraged through public involvement in program implementation. Among the phases of implementation where public involvement may be particularly constructive are the following:

- the planning of facilities required for plan implementation and the raising of revenue for the facilities;
- the creation or modification of water quality standards and effluent permits required for pollution sources in the area;
- the passage of zoning ordinances and other measures necessary to implement the regulatory aspects of the plan;
- the monitoring of pollution sources and development of technical standards for new pollution sources.

6. Plan Revision

Once an areawide plan has been selected, the public should still have the opportunity to participate in any periodic updating of the plan. Information should be available continually to permit evaluation of progress made under the plan.

C. Principles for Public Involvement

While there are no hard and fast rules for structuring a public involvement program, several general principles should be kept in mind:

1. The program should be an active program. Since the optimum degree of public involvement will usually not occur spontaneously, simply providing information to those who ask for it is not adequate. An active program is needed to seek out those who can provide useful inputs, as well as those who will be affected by the plan.

2. The program should include adequate provision for disseminating information to the public. One of the greatest inhibitors to active public involvement in planning programs is lack of readily available information. To preclude this happening in 208 public participation programs, all data and information available to planners must be easily accessible to the public. Depositories of documents and data should be clearly identified to the public, and should remain open for use by the public at times that are generally convenient to

the average citizen. Assistance should be provided in locating specific documents or data retained in the depository; reproduction equipment should be available for use at a moderate cost. Mailing lists and publications should also be used if appropriate.

3. The program should be allocated adequate time and funding within the overall planning effort. Planning and operating an effective program will probably require the full-time efforts of at least one person. Costs of the program should be included in the planning budget.

4. The planning agency should designate and identify to the public a person or persons to be directly responsible for the public involvement program.

5. Those elected officials and representatives of state and federal agencies who must approve or disapprove the recommended final plan should be involved in all significant planning decisions. Channels through which they may be contacted should be clearly identified to the public.

6. The program should be responsive to all interested citizens. Participation in 208 planning should not be dominated by any one interest group or individual. This can best be done by including without exception in mailings, notifications, etc., all parties who express interest in the project or who have been involved in community issues related to water quality planning and management.

10.3 A Model Program for Public Involvement

The task of providing for public participation in the 208 planning process is, ultimately, the job of matching specific participation activities with specific planning tasks. There are many ways in which this matching might occur, depending upon how planning agencies define their tasks in detail and which participation activities they choose to emphasize. The following table (pp. 10-7, 10-8) lists six categories of public participation activity which should accompany each major phase of the planning process and matches them with one suggested definition of planning tasks. Within each category of participation activity will be found one, or several, suggested alternatives for that activity.

One useful method by which planning agencies can assure compliance with the public participation guidelines is to match the public participation items in the table with their own definition of planning tasks. Those responsible for assuring compliance can then "check" a participation activity as it occurs and be sure, finally, that for each major planning task all the major participation activities have been assured.

		PUBLIC PARTICIPATION ACTIVITIES																				
		Informational material and access to information					Public consultation and assistance						Public notice and hearing			Enforcement		Legal Proceedings			Rule-Making	
	SECTION 208 PLANNING PROCESS	News releases and newsletters	Data depositories	Copying facilities	Exhibits	Speeches	Workshops and seminars	Surveys	Advisory groups	Ad hoc committees	Task forces	Staff assistance	Mailing lists	Public hearings	Informal notice	Consideration of citizen views	App't of individual or agency to manage public participation	Public notice	Publication of final decisions	Public hearings	Full information when possible	Public hearings
GOALS AND OBJECTIVES	TECHNICAL PLANNING INPUTS																					
	Planning Sequence 1. Identify Water Quality Problems and Standards																					
DESIGN OF ALTERNATIVES	2. Construct Inventory of Discharges																					
	3-5 Further Prioritize Planning and Choose Design Conditions; Data Collection; Calibration and Verification																					
	6. Projections (including Land Use)																					
	7. Segment Analysis																					
	8. Determine Alternative Subplans Consistent with Eligible Waste Load Reductions (including information on waste loads, costs, reliability, environmental impact, other goals)																					
	9-10 Screen Subplans and Combine into Alternative Areawide Plans																					
	MANAGEMENT PLANNING 1. Definition of Purpose																					
	2. Management Analysis																					
	3. Develop and Screen Alternative Management Plans																					

PUBLIC PARTICIPATION ACTIVITIES

	SECTION 208 PLANNING PROCESS	Informational material and access to information					Public consultation and assistance						Public notice and hearing			Enforcement		Legal Proceedings			Rule-Making	
		News releases and newsletters	Data depositories	Copying facilities	Exhibits	Speeches	Workshops and seminars	Surveys	Advisory groups	Ad hoc committees	Task forces	Staff assistance	Mailing lists	Public hearings	Informal notice	Consideration of citizen views	App't of individual or agency to manage public participation	Public notice	Publication of final decisions	Public hearings	Full information when possible	Public hearings
IMPACT ASSESSMENT	COMBINED PLAN EVALUATION AND SELECTION 1. Combine Technical and Management Plans																					
	2. Compile Information on Alternative Areawide Plans • Contribution to Water Quality and Other Related Water Management Goals of the Area • Technical Reliability • Monetary Costs • Environmental Effects • Economic and Social Effects • Implementation Feasibility • Public Acceptability																					
	3. Compare Alternative Plans and Select Final Plans																					
	4. Develop Detailed Description of Plan Features																					
	5. Include Provisions for Plan Revision and Updating																					
RECOMMENDATIONS AND ACCEPTANCE	PLAN OUTPUTS																					
	PLAN SUBMITTAL, REVIEW, AND APPROVAL																					
PLAN REVISION																						

10.4 Institutional Alternatives for Representation of the General Public

Institutional arrangements to implement requirements for public participation are a matter of local discretion, as long as the provisions made meet the criteria of the Act and federal regulations. However, those arrangements chosen should:

1. Provide clearly defined channels through which citizens may contact decision-makers.

2. Define responsibility for actively carrying out public involvement activities.

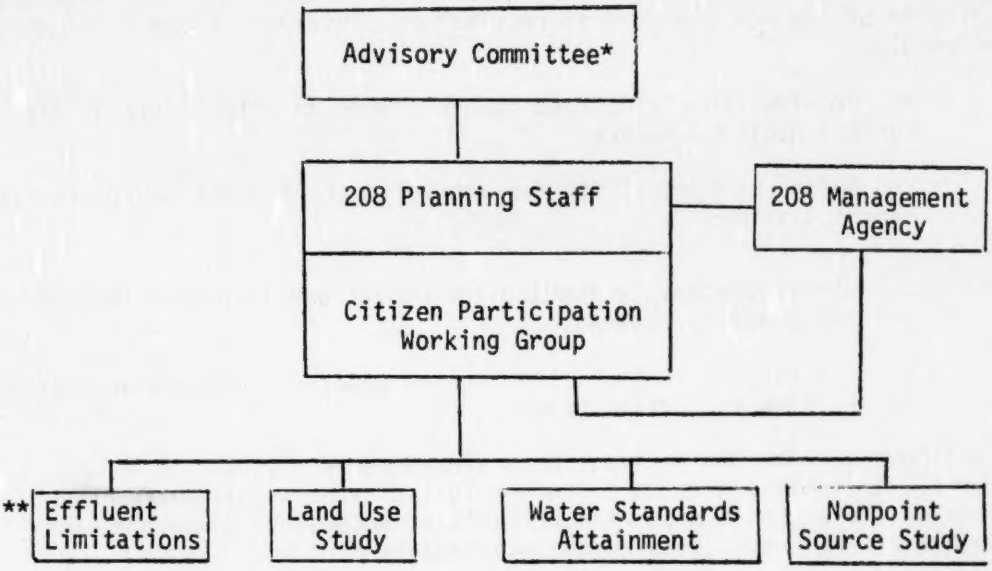
3. Provide adequate funding for public participation throughout the planning process.

4. Be responsive to all interested citizens, but not dominated by any single interest group.

Although a number of institutional arrangements may meet these requirements, a formal mechanism to ensure full citizen understanding and approval of the selected plan will probably be necessary, given the scope and complexity of areawide water quality management.

An exemplary arrangement would be a fully funded public participation working group, acting in partnership with the 208 planning staff and management agency. At least one full time staff member would be needed to carry out the tasks of the working group. Additional funds should be made available to cover the cost of printing, announcements in the media, and other incidental expenses. An illustration of this type of arrangement is provided on the following page.

ORGANIZATIONAL STRUCTURE


Advisory Committee*
208 Planning Staff
208 Management Agency
Citizen Participation Working Group
** Effluent Limitations
Land Use Study
Water Standards Attainment
Nonpoint Source Study

*Composed of non-voting Federal representatives (in compliance with the 304(j) agreement), State and local representation and a voting member of the Citizens Participation Working Group.

**The Working Group may wish to divide itself along the lines of major areas of concern as illustrated.

10.5 Program Evaluation

An important part of any public involvement program is a set of feedback mechanisms to continually monitor the success or failure of the program. If feedback indicates ongoing efforts are inadequate, adjustments should be made as soon as possible, so that the success of the program will not be jeopardized. In making an evaluation, information may be drawn from a variety of sources, including:

1. nature of informal contacts initiated by the public;
2. attendance at meetings and hearings;
3. amount of related public-sponsored activity such as meetings, workshops, door-to-door campaigns, etc.;
4. amount and nature of media coverage;
5. formal surveys.

In addition to monitoring inputs received from the public participation program, an evaluation should also be made of the effect these inputs had on subsequent decision-making. An effective public participation program should be structured in such a way that the inputs received have an influence on later decisions. Otherwise, the program is inadequate, and steps should be taken to correct the deficiency.

10.6 Advisory Committee

In compliance with Section 304(j) of P.L. 92-500, the Administrator of the Environmental Protection Agency has entered into an agreement with the Secretaries of the Departments of Agriculture, Army, and Interior. Notice of Final Agreements was published in the Federal Register, Vol. 38, No. 225, November 23, 1973.

As a result of this agreement, the planning agency in each area designated under Section 208(a)(2) must create an advisory committee, with representatives of the Departments of Agriculture, Interior, and Army invited to participate. Each Department may or may not participate as it deems appropriate. This requirement provides for coordination of the programs authorized under other federal laws with 208 planning.

Pursuant to Section 208(a)(2), grant regulations for Section 208 (40 CFR 35, Subpart F) further state that provisions must be made for inclusion of representatives of the State and the general public on an Areawide Planning Advisory Committee. The membership may be further expanded as considered appropriate by EPA, the State(s), and the applicant agency. A special effort should be made to include representatives of agencies responsible for other environmental programs being conducted in the area.

CHAPTER 11

ENVIRONMENTAL, SOCIAL AND ECONOMIC IMPACT EVALUATION

11.1 Purpose

This chapter provides guidance for integrating environmental, social, and economic impact evaluation into the 208 planning process. It is also intended to meet, in part, the requirements of Sec. 102(2)(c) of the National Environmental Policy Act of 1969 and regulations issued pursuant to that Act. While Section 511 of the FWPCAA can be interpreted to exempt Section 208 from the NEPA requirements, EPA has decided that these requirements still apply due to the facilities planning elements of the 208 plan. The evaluation will, therefore, serve as the applicant's environmental assessment and will also support the preparation of an Environmental Impact Statement if required.

The evaluation must be viewed as an integral part of the planning process. As such, it will be performed throughout the process rather than after the selection of the 208 plan, with citizens and local units of government afforded the opportunity to participate in impact evaluation from the beginning of the planning process. Affected citizens and units of government will thus be better able to analyze the various alternatives, to identify specific plan impacts, and to provide meaningful suggestions and recommendations.

11.2 Environmental, Social and Economic Impact Evaluation Process

A. Inventory Existing Conditions

The purpose of inventorying existing conditions is twofold: (1) to aid in goal and problem identification; and (2) to serve as a basis for the analysis and comparison of alternatives. At a minimum, the inventory should encompass the 208 planning area and other areas that would be affected by the plan. For example, land disposal sites for effluent or sludge, other wastewater reuse sites, and the downstream river corridor that would be affected by effective water quality management should be included. The inventory will undoubtedly require additions as new problem areas are identified in the planning process.

Most of the data needed for the inventory will be readily available in existing documents and may have been gathered for use elsewhere in the planning process. This would be true, for example, for most of the population, land use, and hydrological data. Additionally, items four through fourteen in the inventory are impact categories which may be used in the plan selection process (Chapter 12) to determine differences among the plan alternatives.

Only that data which is relevant to the analysis of alternatives or determination of impacts should be included. Thus, the inventory may include but not necessarily be limited to the following:

1. Climate and precipitation;
2. Topography;
3. Geology;
4. Hydrology (surface and groundwater):
    a. water quality
    b. water quantity
    c. water quality and quantity problems
    d. water uses
    e. water quality management
    f. flood hazards;
5. Biology:
    a. rare and endangered species
    b. fish, shellfish and wildlife habitats, and nursery and spawning areas
    c. fish, shellfish and wildlife population
    d. benthic community structure
6. Air quality;
7. Land uses:
    a. existing land uses
    b. land use planning and controls
    c. amount, type, and intensity of growth (The growth data should be of recent origin. There is no necessity to examine growth trends further back than 1960).
    d. soil types, permeability, and erodability
    e. significant environmentally sensitive areas;
8. Wastewater management resources:
    a. energy (power)
    b. chemicals
    c. land commitment;
9. Population levels:
    a. current
    b. projected (5, 10, 15, and 20 years);
10. Economic activity (gross assessment):
    a. income per capita
    b. agriculture
    c. mining
    d. manufacturing
    e. service;

11. Employment trends including regional availability of skilled manpower for treatment plant operation and monitoring;

12. Other local, state, and federal projects having major interaction with proposed water quality actions;

13. Public health;

14. Aesthetics:

    a. recreational accessibility and activities
    b. unique archeological, historical, scientific, and cultural areas
    c. noise pollution.

The inventory should also include identification of adopted goals and pertinent constraints. Goals might typically include:

1. Preservation of high quality surface water;
2. Preservation of coastal or other wetlands;
3. Preservation or enhancement of fish, shellfish and wildlife;
4. Enhancement of municipal services.

Examples of constraints include:

1. Air quality regulations and implementation plans;
2. Local climate, topography, soils, etc.;
3. Restrictions on flood plain use or other land uses.

B. Evaluate the Existing Situation

Based upon the inventory, a brief analysis of the existing situation should be conducted to prioritize pollution problems and sensitive impact areas. This prioritization which will be a primary concern during the remainder of the evaluation will require participation of the public and local government agencies.

C. Develop Baseline Projection

The inventory and evaluation of the existing situation will serve as inputs into the development of a baseline projection. Construction of a baseline projection of relevant environmental, social, and economic factors (see Table 12.1) will enable evaluation of each alternative.

The baseline projections should be quantitative when data are readily available. In other cases, it should be qualitative. The baseline projection can be established by extrapolating present indicator trends over the planning period. In making this projection, it should be assumed that no additional water quality actions will be taken other than those that have already been approved.

D. Screen Options and Subplans

Both point and nonpoint control options as well as continuous point source, intermittent point source, and nonpoint source subplans should be screened according to the factors set forth in Chapters 5 and 6. (See Chapters 5.2.D, 5.6.D, 6.6.)

E. Evaluate Alternatives

After the alternatives have been developed, each of them should be evaluated by comparing its impact to the baseline projection. Special consideration should be given to those sensitive impact areas identified in the evaluation of the existing situation.

A complete environmental assessment of each alternative is not necessary, although the impact of both the structural and nonstructural aspects of the plan should be considered in every case. Table 12.1 contains a list of those environmental, social and economic factors believed to be generally most important. However, discretion should be employed when using this table. When there is no difference among alternatives, a statement to that effect is sufficient. Similarly, a statement will suffice when an alternative will have no perceptible impact on a given factor.

Special attention should be given to long-term impacts, irreversible impacts, and indirect impacts such as induced development. Resource and energy use associated with each alternative should also be highlighted. The results should be displayed in a format for use in public meetings and other forms of public participation.

11.3 Environmental Effects of the Selected Plan

The results of the environmental, social, and economic impact evaluation will be used in the plan selection process (Chapter 12). Once a plan has been selected, a complete description of the impact that the selected plan will have on the area's environment should be completed. The vast majority of the data required to do this should be readily available from the evaluations already performed. This more detailed evaluation should describe the impact of the proposed structural and nonstructural actions. Whenever possible, the impact of each action on each affected environmental, social, or economic category (see Table 12.1) should be described and displayed. However, if more than one action affects a category, the cumulative impact may be described. Impacts may be categorized as:

1. Primary (direct) or secondary (induced);
2. Beneficial or adverse;
3. Short or long term;
4. Avoidable or unavoidable;
5. Reversible or irreversible.

Included under irreversible impacts should be an evaluation of any irreversible commitments of resources including energy. (See §6.304 (c-f) of 40 CFR Part 6 for an explanation of these terms and examples.)

While emphasis should be given to the cumulative impacts of all elements of the plan, more localized impacts of specific plan elements, such as treatment plant locations, interceptor sewers, and industrial site locations, should also be assessed and highlighted when judged significant. Greater emphasis should be given to the localized impacts of individual projects anticipated to be developed during the initial five years of plan implementation.

CHAPTER 12

COMPARISON OF ALTERNATIVES AND SELECTION OF PLAN

12.1 Purpose

This chapter provides guidance on the comparison of alternative plans leading to the selection of an areawide waste treatment management plan. The process presented here assumes that each of the alternatives, if implemented, would meet all regulatory requirements and comply with appropriate goals and objectives within specified limits of technical reliability. Plans are to be compared in terms of the defined criteria of cost effectiveness as discussed in Chapter 1, feasibility of plan implementation, and public acceptability. Emphasis will also be placed upon drawing together the evaluations already completed so that the alternatives can be more easily discussed and compared. Finally, while public participation is necessary throughout the planning process, it is essential that the public be involved to a significant degree during this stage.

12.2 The Plan Selection Process

A. Assess Alternative Areawide Plans

No rigorous analytical method exists which will readily identify the best plan for the area. As discussed in previous chapters, many factors should be considered in comparing the alternatives. While some of the factors, in particular cost assessments, can be quantified, others can only be qualitatively assessed based upon professional judgement, and the views of the public. Plan assessment involves the comparison of all key factors deemed pertinent for reliable decision making. Table 12.1 contains a list of those which are believed to be generally most important. The inputs for that table are to be developed in the technical planning process (Chapter 3.5.B), the step at which alternative plans are evaluated in light of information on their cost, technical reliability, environmental, social and economic impact, implementation feasibility and public acceptability. The effects of the alternatives should be assessed quantitatively whenever possible. In all other cases a qualitative assessment should be made.

Representatives from all affected groups should be involved in the assessment of the alternative proposals. In most areas, affected groups would include conservation groups, economic interests, local elected officials,planning agencies, state departments of health, water pollution control, and natural resources, the regional office of EPA and the Areawide Planning Advisory Committee. The plan approval and implementation process will be more efficient if the people responsible for carrying it out fully understand the issues and contribute to the assessment and recommendation of alternatives.

B. Develop Recommended Plan

Once the alternative plans have been assessed, the planning agency should be in a good position to compare the alternatives and develop a recommended plan. A logical approach for comparing the alternatives would be to identify initially that alternative which will achieve water quality objectives at minimum monetary cost. This least cost plan can serve as a base against which the increased costs and additional effects of other alternatives can be compared. The major environmental, social and economic impacts of this least cost plan should be listed, including a discussion of the institutional and financial issues that would be raised if the plan were recommended. Most of the required impact information should be contained in Table 12.1. A suggested format for displaying the least cost plan is shown in Table 12.2.

The next step should be the identification of the incremental monetary cost and incremental impacts of each of the remaining alternative plans in relation to the base plan. Information contained in Table 12.1 would provide the basis for this incremental evaluation. Description of alternatives should include the plan elements (such as construction, zoning, operations, etc.) and measures or statements of the changes in the impacts of those plan elements. In addition to the environmental, social, and economic impact and institutional and financial issues, additional benefits that could be gained or undesirable situations that could be avoided should be described. The alternatives should be described in such a way as to make comparisons with the additional costs required as direct as possible. The results may be summarized in the format of Table 12.3.

The planning agency should then conduct workshops for the elected officials who will be reviewing and commenting on the proposed plan to fully inform them of the consequences of implementing any of the alternative areawide plans. The agency should also take note of their responses to the alternatives to see if the alternatives can be changed to improve plan acceptability. Since these workshops and the public hearings to follow could very well result in requirements for substantial changes in the design of plan elements and for further analysis of additional impacts, the agency should schedule resource expenditures to be able to respond fully to the need for additional modifications.

At the conclusion of the workshops, the planning agency should recommend a single plan as the proposed 208 plan. The plan elements, costs, impacts, and implementation issues can be summarized in the format shown in Table 12.2, accompanied by a brief report summarizing the process followed, the alternatives considered, and the criteria used to reach a final recommendation. The report and charts should be suitable for use at public hearings.

C. Hold Public Hearings to Present Proposed Plan

The planning agency should conduct formal public hearings on the proposed plan and the alternatives considered in its development. The planning agency should then respond to the issues raised at the hearings and modify the proposed plan if appropriate (as judged by the agency). The planning agency will then submit the proposed plan to the appropriate local governing bodies for review and recommendations as specified in Chapter 14.

TABLE 12.1

COSTS AND EFFECTS OF ALTERNATIVE AREAWIDE PLANS

	Alternative Plans		
Significant Effects	P-1	P-2	P-3
1. Water Quality Goals			
A. Contribution to goals and objectives of the Act.			
B. Contributions to other water-related goals of the planning area.			
2. Technical Reliability			
A. Frequency of plant upsets			
B. Frequency of spills			
C. Frequency and effects of combined sewer overflows			
D. Nonpoint source control			
E. Regional availability of skilled manpower for treatment plant operation and monitoring			
3. Monetary Costs			
A. Capital costs including discounted deferred costs			
(1) public			
(2) private			
(3) total			
B. O.M. & R. Costs			
(1) public			
(2) private			
(3) total			
C. Net revenue (public)			
D. Overhead and plan management			

TABLE 12.1 (cont)

COSTS AND EFFECTS OF ALTERNATIVE AREAWIDE PLANS

Significant Effects	Alternative Plans		
E. Total average annual costs	P-1	P-2	P-3
(1) public			
(2) private			
(3) total			
4. Environmental Effects			
A. Hydrology (surface and groundwater)			
(1) water quality			
(2) water quantity			
(3) water quality and quantity problems			
(4) water uses			
(5) flood hazards			
B. Biology			
(1) rare and endangered species			
(2) fish, shellfish and wildlife habitats; and nursery and spawning areas			
(3) fish, shellfish and wildlife population			
(4) benthic community structure			
C. Air quality			
D. Land			
(1) change in land uses			
(2) land use planning and controls			
(3) amount, type and intensity of growth (relate to land use)			
(4) soil erosion damage			
(5) significant environmentally sensitive areas			
E. Wastewater management resources			
(1) energy (power)			
(2) chemicals			
(3) land commitment for planned features including sludge disposal sites			
5. Social and Economic Effects			
A. Population changes (5, 10, 15, and 20 year projections)			

TABLE 12.1 (cont)

COSTS AND EFFECTS OF ALTERNATIVE AREAWIDE PLANS

Significant Effects	Alternative Plans		
B. Changes in economic activity where appropriate	P-1	P-2	P-3
(1) income per capita			
(2) agriculture			
(3) mining			
(4) manufacturing			
(5) services			
C. Dislocation of individuals, businesses, or public services			
D. Impact on other local, state and federal projects having major interaction with proposed water quality actions			
E. Public health			
F. Aesthetics			
(1) recreational accessibility and activities			
(2) unique archeological, historical, scientific and cultural areas			
(3) noise pollution			
6. Implementation Feasibility			
A. Legal authority			
B. Financial capacity			
C. Practicability			
D. Coordinative capacity			
E. Public accountability			
7. Public Acceptability			

TABLE 12.2

LEAST COST PLAN

PLAN ELEMENTS (A summary list of planning, construction, zoning, sludge and effluent disposal, operations, monitoring actions, etc., indicating their geographic sites).

1.
2.
3.
.
.
.

TOTAL COST $____________

IMPACTS

DESCRIPTION

Economic

1.

2.

3.

Social

1.

2.

3.

Environmental

1.

2.

3.

IMPLEMENTATION

(Institutional and financial issues.)

TABLE 12.3

ALTERNATIVE LEAST COST PLAN MODIFICATIONS

	Least Cost Alternative	Alternative A	Impacts	Cost Increase	Alternative B	Impacts	Cost Increase
Plan Elements							
1.							
2.							
3.							
.							
.							
.							

CHAPTER 13

REPORTS

13.1 Purpose

The planning report should set forth the technical and management outputs, the process used to achieve those outputs, and the provisions for plan revision. Since the format of the report may differ among 208 areas due to the varying importance of water quality problems and control strategies, a suggested outline for the report is not included in this guideline. The planning agency should work closely with the state and EPA regional representatives in deciding upon the report format. However, the final report should be divided into two major sections--a condensed report on outputs and a full report on the planning process--as discussed below.

13.2 Periodic Reports During Plan Development

Within 30 days following the end of each six month period after the effective date of the grant, the planning agency is required by the grant regulations to submit for review by EPA a semi-annual report of progress and expenditures as compared to the scheduling of approved milestones in the work plan. In many instances, it would be advisable to submit reports quarterly. This will make it easier to track the purposes of the program and identify and solve problems as early as possible. In addition, planning agencies should schedule periodic meetings with their EPA regional and state representatives. In the reports and in the meetings, any lack of scheduled progress and other problems should be fully discussed.

13.3 Final Report

A. Condensed Report on Outputs of the Selected Plan

The condensed report should cover all of the technical and management outputs presented in Chapter 3.6, an implementation schedule for these outputs, and the provisions for performance assessment and plan revision. Supplementary engineering feasibility data on the features included in the first stage development of the municipal wastewater facilities should be appended.

B. Full Report on the Planning Process

A full report on the planning process should discuss the various alternatives considered and the reasons for rejecting those not included in the selected plan. The format for documenting the way in which the planning was carried out can follow the outline of the planning process utilized in this guideline. The report should include any analytical studies and supporting information, demographic information, land use maps and studies, studies on point and nonpoint source control techniques, management, legal, and financial (including budget) studies, etc. The complete environmental assessment should be covered in a single chapter. Where the report on the planning process overlaps the condensed report on outputs, the output report should be referenced.

13. 4 Report on Annual Review of Plan

The approved plan must be reviewed, updated, and certified annually. If substantial revisions result, the entire planning report should be reviewed accordingly. Relatively minor revisions resulting from such an update could be documented, if practical, in an addendum to the initial report.

CHAPTER 14

PLAN SUBMITTAL, REVIEW AND APPROVAL

14.1 Introduction

Each 208 planning agency must submit its areawide waste treatment management plan, including recommendations for management agency(s), to the appropriate EPA Regional Administrator within 24 months after the award of the planning grant. This plan must be submitted to EPA through the governor or state reviewing agency designated by the governor.

14.2 Submittal and Review of Interim Outputs

Prior to submittal of the selected plan, certain interim outputs are necessary to guide further facilities planning. Among these are the following interim outputs which are to be completed to promote consistency and compatibility in subsequent facilities planning:

. Service area delineation for municipal wastewater treatment systems throughout the designated area

. Existing population and land use and projected population and land use for the twenty (20) year planning period

. Projected waste loads and flows generated for each service area corresponding to the existing and projected population and land use

. Revision (if any) of the waste load allocations

These interim outputs must be completed within nine (9) months, unless the EPA Regional Administrator grants time extensions upon the recommendation of the 208 planning agency and the state. Upon completion of the interim outputs, the 208 planning agency should submit them to the state for review and approval and transmittal to the EPA Regional Administrator for concurrence as fulfilling partial requirements of 208 planning.

In some instances, further areawide planning may reveal that the interim outputs should be modified. Such modifications and associated justifications should be promptly brought to the attention of the state and affected facilities planning agencies. (This should occur in the normal process of having close and continuing coordination between states, areawide, and facilities planning agencies). The state should determine the feasibility and practicality of incorporating these modifications in the facilities planning and obtaining concurrence of the Regional Administrator.

The planning agency may identify additional interim outputs, such as nonpoint source controls, which they believe should be reviewed by the state and EPA. The identification and accomplishment of interim outputs will depend primarily upon the ability to complete tasks prior to selection of the completed plan, the general acceptance of the results of those tasks by the governmental organizations and agencies involved, and the need for the interim outputs to support further related activities within the area. These outputs, if any, should be reviewed according to the procedure discussed above.

14.3 Local Review and Recommendation of the Selected Plan

Prior to submitting its plan to EPA through the appropriate governor or state reviewing agency, the planning agency must provide the governing bodies of local governments having responsibility for, or which would be directly affected by, implementation of the plan and having jurisdiction in the planning area, an opportunity to comment on the plan and proposed management agency(s) and make recommendations for approval or disapproval. In the event that a local unit of government fails to provide a recommendation within 30 days of receiving the request, the planning agency may consider that the plan has been favorably recommended by that unit of local government.

The recommendations, whether favorable or unfavorable, are to be forwarded by the planning agency to the governor in connection with his certification of the initial plan. The local comments are also to be forwarded to the appropriate EPA Regional Administrator when the plan is submitted to EPA by the state.

14.4 State Review and Certification of Approval

When the plan is received by the governor prior to its submission to EPA, the governor or the state reviewing agency must review the plan for the necessary certification of approval required by Section 208(b)(3) of the Act. The purpose of the state's review is to determine whether:

1. The plan is in compliance with the provisions of the state program prepared under Section 106 of the Act and will then be accepted as a detailed portion of the state plan when approved by EPA;

2. Implementation of the plan will enable meeting the 1983 goals of the Act;

3. The plan is in conformance with Sections 201, 208, and 303 of the Act;

4. The plan is in conformance with the requirements set forth in 40 CFR 35, Subpart F, as well as any other applicable regulations.

Based on the state's review of the plan and the recommendations received from the local units of government, the governor must then determine whether to approve or disapprove the plan.

If the governor approves the plan, he must then forward the plan to the appropriate EPA Regional Administrator with his certification of approval and proposed designation of management agency(s). The governor must also forward the recommendations received from the local units of government.

If disapproval is necessary, that is, if no certification of approval can be issued by the governor due to failure of the planning agency to comply with one or more of the above provisions, the governor must notify the appropriate EPA Regional Administrator and the planning agency that the plan is deficient and specify how the plan is to be modified so that it may receive state certification of approval.

14.5 EPA Review and Approval

The appropriate EPA Regional Administrator will be responsible for plan approval. The Regional Administrator's approval of the plan will be based upon: (1) the state's certification of approval and proposed designation of management agency(s); and (2) EPA's review of the plan submission to determine that it fulfills the requirements stipulated in subpoints 2, 3, and 4 of section 4 of this chapter. State and local comments and recommendations will also be considered. (Note: EPA will not approve any plan in the absence of proposed designation of management agency(s)).

Within 120 days after receiving the plan submittal, the Regional Administrator must:

1. Notify the state(s) and the planning agency of approval of the plan and the proposed management agency(s) designation; or

2. Notify the state(s) and the planning agency that the submittal is deficient in one or more respects and specify the ways in which the submittal must be modified to receive EPA approval. EPA must also specify the time period allowed for the modifications; or

3. Notify the state(s) and the planning agency that the designation of waste treatment management agency(s) cannot be approved due to failure to meet the requirements set forth in Section 208(c)(2) of the Act, thereby delaying further consideration of the plan until the deficiencies are remedied. EPA must also specify the time period allowed for correcting the deficiencies.

14.6 Annual Certification of Consistency

After the plan has been approved, it must be certified annually by the governor or his designee (or governors or their designees where more than one state is involved) as being consistent with applicable basin plans. The management agency(s) should initiate the annual certification process. After receiving certification, the plan must be submitted to the appropriate EPA Regional Administrator for approval. If the governor fails to certify, notification should be given to the appropriate EPA Regional Administrator and the management agency(s) explaining the modifications necessary to receive certification.

GLOSSARY

The Act - Public Law 92-500. "This Act may be cited as the 'Federal Water Pollution Control Act Admendments of 1972.'" (Act, Section 1).

Base level technology - Minimum level of treatment required by the Act.

Basin - "The term 'basin' means the streams, rivers, tributaries, and lakes and the total land and surface water area contained in one of the major or minor basins defined by EPA, or any other basin unit as agreed upon by the State(s) and the Regional Administrator." (40 CFR 130.2(1)).

Best Available Technology (BAT) - "Not later than July 1, 1983, effluent limitations for categories and classes of point sources, other than publicly owned treatment works,...shall require application of the best available technology economically achievable for such category or class, which will result in reasonable further progress toward the national goal of eliminating the discharge of all pollutants as determined in accordance with regulations issued by the Administrator pursuant to section 304(b)(2) of this Act..."(Act, Section 301(b)(2)(A)).

Best Practicable Control Technology (BPCT) - "Not later than July 1, 1977, effluent limitations for point sources, other than publicly owned treatment works, shall require the application of the best practicable control technology currently available as defined by the Administrator pursuant to Section 304(b) of this Act..."(Act, Section 301(b)(1)(A)). This is also referred to as Best Practicable Technology (BPT).

Best Practicable Waste Treatment Technology (BPWTT) - "Waste treatment management plans and practices shall provide for the application of the best practicable waste treatment technology before any discharge into receiving waters, including reclaiming and recycling of water and confined disposal of pollutants so they will not migrate to cause water or other environmental pollution...." (Act, Section 201(b)).

Capital intensive - Measure requiring initial capital outlays for its development and relatively little cost for operation and maintenance.

Combined sewer - "A sewer intended to serve as a sanitary sewer and a storm sewer, or as an industrial sewer and a storm sewer." (40 CFR 35.905-2)

Discharge of pollutants - "The term 'discharge of a pollutant' and the term 'discharge of pollutants' each means (A) any addition of any pollutant to navigable waters from any point source, (B) any addition of any pollutant to the waters of the contiguous zone or the ocean from any point source other than a vessel or other floating craft." (Act, Section 502(12)).

Effluent limitation - "The term 'effluent limitation' means any restriction established by a State or the Administrator on quantities, rates, and concentrations of chemical, physical, biological, and other constituents which are discharged from point sources into navigable waters, the waters of the contiguous zone, or the ocean, including schedules of compliance." (Act, Section 502 (11)).

Effluent limited segments - "Any segment where it is known that water quality is meeting and will continue to meet applicable water quality standards or where there is adequate demonstration that water quality will meet applicable water quality standards after the application of the effluent limitations required by Sections 301(b)(1)(A) and 301(b)(1)(B) of the Act."(40 CFR 130.11(d)(2)).

Facilities planning - Provides "for cost-effective environmentally sound and implementable treatment works which will meet applicable requirements of sections 201(g), 301, and 302 of the Act." (Guidelines for Facilities Planning, January 1974, p.3)

Infiltration - "The water entering a sewer system, including sewer service connections, from the ground, through such means as, but not limited to, defective pipes, pipe joints, connections, and manhole walls. Infiltration does not include, and is distinguished from, inflow." (40 CFR 35.905-9).

Inflow - "The water discharged into a sewer system, including service connections, from such sources as, but not limited to, roof leaders, cellar, yard and area drains, foundation drains, cooling water dischargers, drains from spring and swampy areas, manhole covers, cross connections from storm sewers and combined sewers, catch basins, storm waters, surface runoff, street wash waters, or drainage. Inflow does not include, and is distinguished from, infiltration." (40 CFR 35.905-11).

Inplace pollution source - Time buildup of pollutant load deposited in a receiving water bed and existing as a load upon that receiving water.

Interim Facility - A temporary treatment facility, either public or private, designed for a useful life of usually less than five years, and with a treatment capacity usually less than five million gallons per day.

Land use - The physical mode of utilization or conservation of a given land area at a given point in time.

Land use controls - Methods for regulating the uses to which a given land area may be put, including such things as zoning, subdivision regulation, and flood-plain regulation.

Materials balance - An illustration of the principle of conservation of matter; that is, an accounting may be performed of all transfers of mass from one point or state to other points or states, such that the total original mass is entirely accounted for.

Maximum daily load - "Each plan shall include for each water quality segment the total maximum daily loads of pollutants, including thermal loads, allowable for each specific criterion being violated or expected to be violated." (40 CFR 131.304 (a)).

Navigable waters - "The term 'navigable waters' means the waters of the United States, including the territorial seas." (Act, Section 502(7)).

1983 goals - Pertains to goals outlined in Section 101 (a) and elsewhere in the Act.

1977 goals - Pertains to the July 1, 1977 milestone set by the Act, particularly in terms of treatment technology and limitations.

Nonpoint source - Generalized discharge of waste into a water body which cannot be located as to a specific source, as outlined in Section 304 (e) of the Act.

Permits - "The Administration may...issue a permit for the discharge of any pollutant, or combination of pollutants,...upon condition that such discharge will meet either all applicable requirements under Sections 301, 302, 306, 307, 308, and 403 of this Act, or prior to the taking of necessary implementing actions relating to all such requirements, such conditions as the Administrator determines necessary to carry out the provisions of this Act. (Act, Section 402 (a)(1)). "The Administrator shall authorize a state, which he determines has the capability of administering a permit program which will carry out the objective of this Act, to issue permits for discharges into the navigable waters within the jurisdiction of such state." (Act, Section 402 (a)(5)). The permit program is a part of the National Pollutant Discharge Elimination System (NPDES).

Planning Agency - "The governor...or governors shall...designate the 208 planning area including its boundaries, and for each area a single representative agency to be responsible for the planning....The agency shall be a representative organization whose membership shall include but need not be limited to elected officials of local governments, or their designees, having jurisdiction in the designated planning area." (40 CFR 126.12, 126.11).

Planning period - "The period over which a waste treatment management system is evaluated for cost-effectiveness. The planning period commences with the initial operation of the system." (40 CFR Part 35, Subpart E, Appendix A, d(3)). In the case of 208 planning, the planning period is 20 years. However, planning agencies are given two years to develop an initial 208 plan once the planning process is begun.

Planning process - Strategy for directing resources, establishing priorities, scheduling actions, and reporting programs toward achievement of program objectives.

Point source - "The term 'point source' means any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged." (Act,Section 502(14)).

Pollutant - "The term 'pollutant' means dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand. cellar dirt and industrial, municipal, and agricultural waste discharged into water." (Act,Section 502(6)).

Pretreatment - "The Administrator shall...publish proposed regulations establishing pretreatment standards for introduction of pollutants into treatment works...which are publicly owned for those pollutants which are determined notto be susceptible to treatment by such treatment works or which would interfere with the operation of such treatment works." (Act, Section 307(b)(1)). "Not later than July 1, 1977,...in the case of discharge into a publicly owned treatment works,...shall require compliance with any applicable pretreatment requirements...under section 307 of this Act." (Act,Section 301(b)(1)(A)).

Residual waste - Those solid, liquid, or sludge substances from man's activities in the urban, agricultural, mining and industrial environment not discharged to water after collection and necessary treatment.

Secondary treatment - "There shall be required...for publicly owned treatment works in existence on July 1, 1977, or approved... prior to June 30, 1974...effluent limitations based upon secondary treatment as defined by the Administrator pursuant to section 304(d)(1) of this Act." (Act,Section 301(b)(1)(B)). "The Administrator...shall publish...information, in terms of amounts of constituents and chemical, physical, and biological characteristics of pollutants, on the degree of effluent reduction attainable through the application of secondary treatment." (Act,Section 304(d)(1)).

State water quality standards - The term "State Water Quality Standards" means those State adopted and Federally approved uses and criteria that are legally applicable to the interstate and intrastate waters. The water quality standards are incorporated by reference in Part 120 of Title 40 of Code of Federal Regulations.

Storm sewer - "A sewer intended to carry only storm waters, surface run-off, street wash waters, and drainage." (40 CFR 35.905-22).

Upstream pollutant source - Source of pollutant discharged into the receiving waters which is located upstream from the area of consideration.

Waste load allocation - "A waste load allocation for a segment is the assignment of target loads to point, and, if appropriate, to nonpoint sources to achieve water quality standards in the most effective manner." (Guidelines for Preparation of Water Quality Management Plans, September, 1974, p.19).

Waste treatment facilities - "Any devices and systems used in the storage, treatment, recycling and reclamation of municipal sewage or industrial wastes of a liquid nature...in addition, ...any other method or system for preventing, abating, reducing, storing, treating, separating, or disposing of municipal waste, including waste in combined storm water and sanitary sewer systems." (Act, Section 212(2)). Also termed treatment works.

Water quality limited segments - "Any segment where it is known that water quality does not meet applicable water quality standards, and is not expected to meet applicable water quality standards even after the application of the effluent limitations required by sections 301(b)(1)(A) and 301(b)(1)(B) of the Act." (40 CFR 130.11 (d)(1)).

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National Technical Information Service
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The National Technical Information Service has available for sale, both paper and microfiche copies of many EPA technical reports. Some reports are, however, available only in microfiche. Information on availability and prices is given only by mail and can be obtained by writing to the NTIS and giving them the following information:

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EPA REGULATIONS

Most of these regulations should be available in EPA Regional Offices. All of these regulations also appear in the *Code of Federal Regulations: 40 Protection of Environment*. This document is published by the Office of the Federal Register, National Archives and Records Service, General Services Administration and is revised as of July 1, 1974. Copies of this document are obtainable from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Call area code: 202, 783-3238 for information as to availability and price.

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